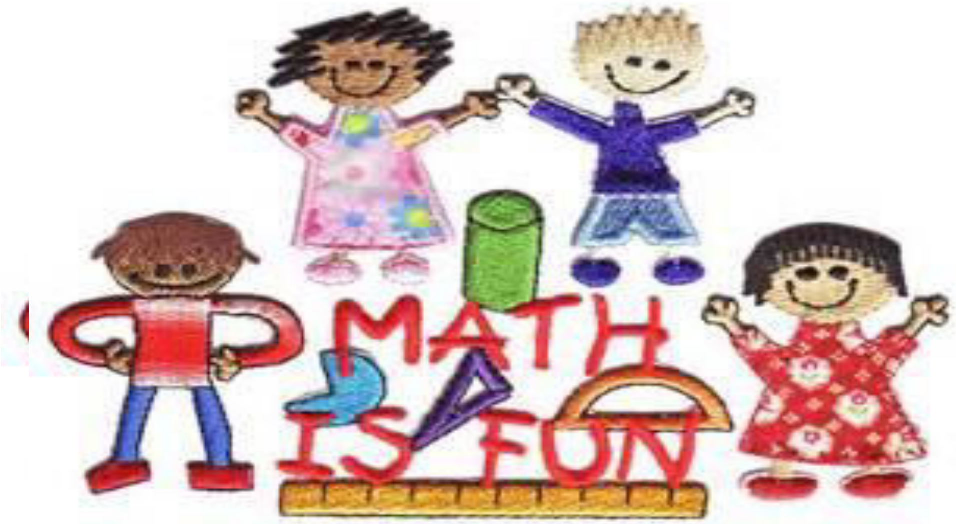
Geel 2000 Language Schools

Math Department

Second term

Prep . 3



2022/2023

Name :-----------------------------------

Class:-----------------------------------

Unit 1 Lesson 1 : Solving 2 equations

1)Complete :

1) The S.S of the two equations : $x + y = 0$, $y - 5 = 0$ in R x R is …………………………
2) The S.S of the two equations : $x + 3y = 4$, $3y + x = 1$ in R x R is …………………
3) The S.S of the two equations : $4x + y = 6$, $8x + 2y = 12$ in R x R is ……………
4) If $L_1 \cap L_2 = \emptyset$, then the S.S of the two equations which are represented by the two St. lines L_1 and L_2 are ………………………..
5) If : $x + y = 5$, $x - y = 3$, then : $x^2 - y^2 =$ ……………………
6) If the two St. lines which represent the two equations $x + 2y = 4$, $x + ay = 7$ Are parallel , then a = ……………..
7) If there is only one solution for the two equations $x + 2y = 1$ and $2x + ky = 2$, then k cannot equal …………

2)Choose the correct answer :

1)The two St. lines : $2x = 3$ and $3y = 5$ are ………………
(a) perpendicular (b)coincident (c)parallel (d)intersecting

2)The two straight lines : $y = x - 3$, $y = x + 3$ are …………….
(a) parallel (b)perpendicular (c)coincident (d)intersecting

3)The two St. lines : $3x + 5y = 0$, $5x - 3y = 0$ are intersecting at

(a) the origin point (b) the first quadrant

(c) the 2^{nd} quadrant (d)the 4^{th} quadrant

4) 16)The number of solutions of the two equations : $x + y = 2$ and $y - 3 = 0$ is …..
(a) zero (b) one (c) two (d) Three

Geel 2000

3)Find the solution set of the equations in R x R :

A) $x + y = 5$, $x - y = 1$

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

B) $2x - y = 3$, $x + 2y = 4$

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

C) $y = x + 4$, $x + y = 4$

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

4)Find algebraically & graphically in R x R the S.S of each pair of the following equations :

1) $x + 2y = 8$, $3x + y = 9$

2) $2x + y = 1$, $x + 2y = 5$

3) $x + 2y = 8$, $3x + y = 9$

5)What's the number of solutions of each pair of the following equations :

1) $7x + 4y = 6$, $5x - 2y = 14$
(………………)

2) $4x + 2y = 10$, $y = -2x - 5$
(………………..)

3) $9x + 6y = 24$, $3x + 2y = 8$
(………………)

Geel 2000

<u>6)Find the value of a and b :</u>

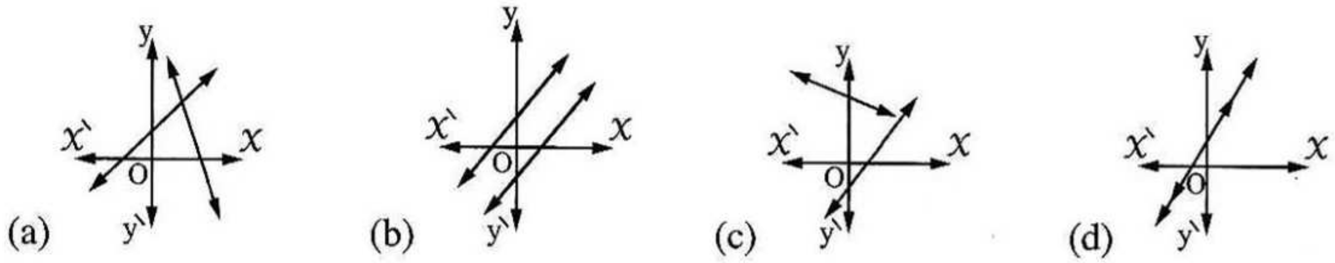
1) $a x + b y + 5 = 0$, $2 a x + b y - 1 = 0$

given that (1 , 2) is a solution for two equations

2) If : $f(x) = a x^2 + b$, $f(1) = 5$, $f(2) = 11$

<u>Use your mind to choose the correct answer :</u>

1)Which of the following graphs represents two equations of the first degree in two variables which have no common solution ?



Unit 1 Lesson 2 : Applications

1)The sum of two natural numbers is 42 and their difference is 10
Find the two numbers ?

....
....
....

2)A rectangle is with a length more than its width by 4 cm . If the perimeter of the rectangle is 28 cm .Find the area of the rectangle ?

....
....
....

3)Two supplementary angles , the twice of the measure of their bigger equals seven times the measure of the smaller . Find the measure of each angle ?

....
....
....

4)Two acute angles in a right – angled triangle , the difference between their measures is 50 . Find the measure of each angle ?

....
....
....

Geel 2000

5)A rectangle of perimeter 24 cm . If its length decreased by 4 cm and its width increased by 2 cm became a square .Find the area of the square ?

………………………………………………………………………………………
……………………………………………………………………………………

6)If three times a number is added to twice a second number the sum is 2 , and if the first number is added to three times the second number the sum is 10
Find the two numbers ?

………………………………………………………………………………………
……………………………………………………………………………………

7)Two complementary angles , three times the measure of one of them is more than half the measure of the other by 18 . Find the measure of each of them ?

………………………………………………………………………………………
……………………………………………………………………………………

Geel 2000

Unit 1 Lesson 3 : Solving 2nd degree

Find in R the S.S of each of the following equations using the general formula :

1) $x^2 + 7x + 2 = 0$ approximate the result to the nearest tenth

……………………………………………………………………………………………

……………………………………………………………………………………………

2) $x^2 - 4x + 1 = 0$ approximate the result to the nearest 2 decimals

……………………………………………………………………………………………

……………………………………………………………………………………………

3) Graph the function $f: f(x) = x^2 - 2x$ in the interval [- 1 , 3] , from the graph find the S.S of the equation : $x^2 - 2x = 0$?

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

4) Graph the function $f: f(x) = x^2 - 4x + 3$ on the interval [-1 , 5] and from the graph , find :

a) The minimum value of the function

b) The equation of the axis of symmetry

c)The S.S of the equation $f(x) = 0$

……………………………………………………………………………………………

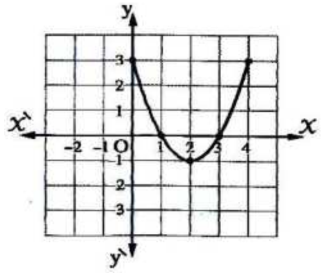
……………………………………………………………………………………………

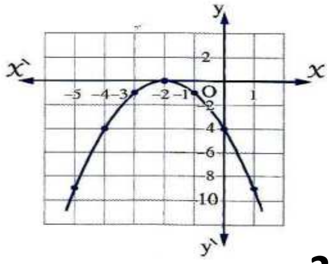
……………………………………………………………………………………………

……………………………………………………………………………………………

Geel 2000

2) From following figures the S.S of the equation $f(x) = 0$ in R is





……………. **………………. 2**

-3 - Choose the correct answer from the given ones

(1) the curve of the function f such that f(x) = $x^2 - 3x + 2$ cuts x-axis at the two points…….

(a) (2 , 0) , (3 , 0) (b) (2 , 0) , (1 , 0)

(c) (-2 , 0) , (-1 , 0) (d) (2 , 0) , (-1 , 0)

(2) The solution set of the equation $2x^2 + 5x = 0$ …….

(a) { 0 , 5 } (b) { 0 , $\frac{-5}{2}$ } (c) { 2 , 5 } (d) φ

(3) The solution set of the equation $x^2 - 4x + 4 = 0$ …….

(a) { -2 , 2 } (b) { 4 , 1 } (c) { 2 } (d) φ

(4) The solution set of the equation $x^2 + 5 = 0$ …….

(a) { $\sqrt{5}$, $-\sqrt{5}$ } (b) { $-\sqrt{5}$ } (c) { $\sqrt{5}$ } (d) φ

(5) In the equation: $ax^2 + bx + c = 0$, if $b^2 - 4ac > 0$, then the number of roots equals:…………

(a) 1 (b) 2

(c) 0 (d) underdetermined

Geel2000

4- Find the solution set for each pair of the following equations by using the formula:

(1) $x^2 - 2x - 4 = 0$ knowing that $\sqrt{5} \approx 2.24$

....

....

(2) $x^2 = 2(x + 6)$ knowing that $\sqrt{52} \approx 7.2$

....

....

(3) $(x - 1)^2 = 10$ knowing that $\sqrt{10} \approx 3.16$

....

....

(4) $x^2 - 2(x+3) = 0$ knowing that $\sqrt{7} \approx 2.65$

....

....

(5) $(x - 3)^2 - 3(x - 3) + 1 = 0$ knowing that $\sqrt{5} \approx 2.24$

....

....

(6) $1 - \frac{2}{x} = \frac{2}{x^2}$ (where $x \neq 0$) knowing that $\sqrt{3} \approx 1.73$

....

....

(7) $9x^2 - 24x + 16 = 0$

....

....

Geel 2000

(8) $x^2 = 2(x - 6)$

....

....

(9) $x + \frac{4}{x} + 1 = 0$ (where $x \neq 0$)

....

....

(10) if $x^4 + 2x^2 - 1 = 0$

....

....

Geel 2000

Unit 1 Lesson 4 : 1^{st} & 2^{nd} degree

1)Complete:

1) If $x^2 - y^2 = 40$, $x + y = 10$, then $x - y =$ ……….

2)The S . S of the two equations : $x - y = 0$, $x y = 9$ in R x R is ……….

3)The ordered pair which satisfies each of the two equations
$xy = 2$, $x - y = 1$ is …………………..

2- Find in R x R the S . S of each pair of the following equations :

1) $x - y = 0$, $2 x^2 - y^2 = 9$

……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………

2) $x - y = 1$, $x^2 + y^2 = 25$

……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………

3) $y - x = 3$, $x^2 + y^2 - x y = 13$

……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………

Geel 2000

3)**The perimeter of a rectangle is 14 and its area is 12 cm^2 .Find its two**
Dimensions

………………………………………………………………………………………
………………………………………………………………………………………
………………………………………………………………………………………
………………………………………………………………………………………..

4)For a rhombus , the difference between the lengths of its diagonals equals 4 cm and its perimeter is 40 cm .Find the lengths of the diagonals .

………………………………………………………………………………………
………………………………………………………………………………………
………………………………………………………………………………………
………………………………………………………………………………………

5)The sum of two real numbers is 9 and the difference between their squares equals 45 .Find the two numbers .

………………………………………………………………………………………
………………………………………………………………………………………..
………………………………………………………………………………………

6)A length of a rectangle is 3 cm more than its width and its area is 28 cm^2 . Find its perimeter

………………………………………………………………………………………
………………………………………………………………………………………
………………………………………………………………………………………
…………………………………………………………………………………….…..

7)**A right angled – triangle of hypotenuse length 13 cm . and its perimeter is 30 cm . Find the lengths of the other two sides .**

………………………………………………………………………………………
………………………………………………………………………………………

GeeI2000

8)The sum of two real positive numbers is 17 and their product is 72

Find the two numbers

………………………………………………………………………………………

………………………………………………………………………………………

9) Complete :

1) If the curve of the quadratic function does not intersect the x-axis at any point , then the number of solutions of the equation $f(x) = 0$ in R is …………………..

2) If the curve of the quadratic function intersects the x-axis at the two points (2 , 0) , (-3 , 0) , then the solution set of the equation $f(x) = 0$ in R is …………………..

3) If x ∈ R , then the equation $x^2 + x + 1 = 0$ has ……….. roots .

4) The curve of the function $f : f(x) = x^2 - 5x$ intersects the x- axis at the two points ….

5) If the S.S of the equation : $4x^2 + 4x + k = 0$ is $\{\frac{-1}{2}\}$, k = ……………..

6) If : x = 3 is one of the solutions for the equation : $x^2 + bx - 12 = 0$, the b = ………

Geel 2000

Model Exam on Unit One

(1) The degree of the equation $3x + 4y + xy = 5$ is ……..

(a) zero (b) first (c) second (d) third

(2) one solution of the equation $x^2 - y^2 = 3$ in R may be ……..

(a) (1 , -2) (b) (-2 , 1) (c) (1 , 2) (d)(-1 , -2)

(3) the ordered pair that satisfies both of the two equations $xy = 2$ & $x - y = 1$ is …….

(a) (1 , 2) (b) (2 , 1) (c) (1 , 1) (d)(2 , -1)

(4) The solution set of the two equations: $x = y$, $x y = 1$

is …….

(a) {(1 , 1)}
(b) {(-1 , -1)}
(c) {(1 , -1)}
(d){(-1 , -1)} , {(1 , 1)}

(5) The solution set of the two equations: $x - y = 0$, $x y = 9$ is …….

(a) {(0 , 0)}
(b) {(-3 , -3)}
(c) {(3 , 3)}
(d){(-3 , -3) , (3 , 3)}

(6) One solution of the equations: $x - y = 2$, $x^2 + y^2 = 20$ in R may be ……..

(a) (-4 , 2) (b) (2 , -4) (c) (3 , 1) (d)(4 , 2)

Geel 2000

2 - Find the solution set for each pair of the following equations

(1) $x + 1 = 0$, $x^2 + y^2 = 17$

(2) $x - 2 = 0$, $x^2 + xy + y^2 = 7$

(3) $x - y = 0$, $xy = 1$

(4) $x + y = 0$, $2x^2 - y^2 = 4$

(5) $x - 2y = 0$, $x^2 - y^2 = 3$

(6) $x - y = 1$, $x^2 + y^2 = 25$

(7) $y = x - 5$, $x^2 - 2xy = 16$

(8) $y - x = 3$, $x^2 + xy - 4 = 0$

(9) $x - 2y - 1 = 0$, $x^2 - xy = 0$

(10) $y + 2x = 7$, $2x^2 + x + 3y = 19$

3 - Applications

(1) If the sum of two integer numbers is 3, and the sum of their square is 5, find the two numbers.

(2) Two numbers one of them is the additive inverse of the other, and the sum of their squares is 2, find the two numbers.

(3) If the difference between two numbers is 5, and their product is 36, then find the two numbers.

(4)) If the sum of two integer numbers is 9, and the difference between their square is 27 find the two numbers.

Geel2000

(5) Find the number which is formed from two digits, if the units digit is twice the tens digit, and if the product of the two digits equals half the original number.

(6) The length of a rectangle is 3 more than its width, and its area is 28cm^2. find its perimeter.

(7) Find the two dimensions of a rectangle if its perimeter is 24 cm. and its area is 35 cm^2.

(8) Find the two dimensions of a rectangle if its diagonal of length 5 cm. and its perimeter is 14 cm.

(9) The hypotenuse of a right angle triangle is 13 cm. and its perimeter is 30cm. find the length of the other two sides,

(10) The difference between the lengths of the two rhombus's diagonals is 4cm. and its perimeter is 40 cm. Find the length of each diagonal.

4- Answer the following questions:

(1) Graph the function f where f(x) = $x^2 - 3x + 2$, $x \in [-1 , 4]$ then from the

Graph find .

(a) The vertex point of the curve

(b) The maximum or minimum value of the function f .

(c) The solution of the equation $x^2 - 3x + 2 = 0$

(2) Graph the function f where f(x) = $x^2 - 4x - 2$, $x \in [-1 , 5]$ then from the

Graph find the solution set of the equation f(x) = 0

Geel2000

Unit 2 Lesson 1 : Set of zeroes

1)Determine the set of zeroes of the polynomial function which are defined by the following rules in R :

1) $f(x) = 4x + 12$
…………………………………………………………………………

2) $f(x) = x^2 - 5x$
…………………………………………………………………………

3) $f(x) = 6x^3 - 18x^2$
…………………………………………………………………………

4) $f(x) = x^2 + 25$
…………………………………………………………………………

5) $f(x) = (x - 2)(x + 3) + 4$
…………………………………………………………………………

2)Complete :

1) The set of zeroes of the function $f : f(x) = -4x$ is ……………

2) The set of zeroes of the function $f : f(x) = 8x^2$ is ……………

3) The set of zeroes of the function $f : f(x) = 10$ is ……………

4) The set of zeroes of the function $f : f(x) = 0$ is ……………

Geel 2000

5) The set of zeroes of the function f : f (x) = x^2 - 49 is ……………………………………………………………………………………..

6) The set of zeroes of the function f : f (x) = x^2 + k x + 1 is ∅ , then k may equal ……………..

7)If z (f) = { 5 } , f (x) = $x^3 - 3x^2 + a$, then a = …………..

8)If z (f) = { 1 , -2 } , f (x) = $x^2 + x + a$, then a = …………..

9) If the set of zeroes of the function f where f (x) = x^2 + k is { 6 , -6 } Then k = ……………

Complete the following:

(1) The set of zeroes of f where f(x) = x – 5 is …………

(2) The set of zeroes of f where f(x) = 4 is …………

(3) The set of zeroes of f where f(x) = $x^2 + 9$ is …………

(4) The set of zeroes of f where f(x) = $4x^2 - 9$ is …………

(5) The set of zeroes of f where f(x) = $(x - 5)^2$ is …………

Geel 2000

Unit 2 Lesson 2 : Equality of functions equations

1)Determine the domain of each the algebraic fractional functions :

1) $n(x) = \frac{x - 5}{6\ x}$

……………………………………………………………………

2) $n(x) = \frac{x^2 + 2}{x^2 - 81}$

……………………………………………………………………

3) $n(x) = \frac{x^2 - 1}{x^2 + 1}$

……………………………………………………………………

4) $n(x) = \frac{6\ x}{6\ x^3 - 54\ x}$

……………………………………………………………………

2)Find the common domain of the following algebraic fractions :

1) $\frac{7\ x}{x^3 - 27}$, $\frac{x + 12}{x^2 - 144}$

……………………………………………………………

2) $\frac{x^2 + x + 1}{2\ x^4}$, $\frac{x^2 - 1}{x^2 - x}$

……………………………………………………

3) $\frac{x + 5}{2}$, $\frac{3}{x^2 - 25}$, $\frac{3\ x}{x^2 - 5\ x}$

……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

Gel2000

3)Complete:

1) The domain of the algebraic fraction function is R – the set of ……….
2) The domain of the function $f : f(x) = \frac{1}{x^3}$ is …………
3) The domain of the function $f : f(x) = \frac{x^3 - 4x}{2x + 4}$ is……….
4) If $n(x) = \frac{x}{x^2 + 4}$, then n (x) ∈ R for each x ∈ …………
5) If $n(x) = \frac{7}{x + a}$ and the domain of the function n is R – { -2 } , a = ….
6) If the function $f : f(x) = \frac{x - 5}{x^2 - a}$ has the domain R-{-5 , 5 } , a = …….

4)Reduce each of the following algebraic fractions to the simplest form showing the domain of each of them :

1) $n(x) = \frac{x^2 - 4x}{x^2 - 16}$

…………………………………………………………………………………………

…………………………………………………………………………………………

2) $n(x) = \frac{x^2 - 6x + 9}{2x^3 - 18x}$

…………………………………………………………………………………………

…………………………………………………………………………………………

5)In each of the following , Show that $n_1 = n_2$ or not :

1) $n_1(x) = \frac{x^3 - 1}{x^3 + x^2 + x}$, $n_2(x) = \frac{(x - 1)(x^2 + 1)}{x^3 + x}$

…………………………………………………………………………………………

…………………………………………………………………………………………

Geel 2000

2) $n_1(x) = \frac{2x}{2x+8}$, $n_2(x) = \frac{x^2+4x}{x^2+8x+16}$

……………………………………………………………………

……………………………………………………………………

6)In each of the following , Show that $n_1 = n_2$ or not

1)$n_1(x) = \frac{x^2-9}{x^2+4x+3}$, $n_2(x) = \frac{x-3}{x+1}$

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

2)$n_1(x) = \frac{2}{2x-10}$, $n_2(x) = \frac{5+x}{x^2-25}$

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

3)$n_1(x) = \frac{x^2-3x}{x^2-6x+9}$, $n_2(x) = \frac{x^2+3x+9}{x^3-27}$

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

7)Reduce each of the following algebraic fractions to the simplest form showing the domain of each of them :

1) $n(x)=\frac{x^3+8}{x^3-2x^2+4x}$

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

2) $n(x)=\frac{(x-2)^2-1}{x(x-3)}$

Geel 2000

Unit 2 Lesson 3 : Operations on functions

1)In each of the following find n (x) in the simplest form showing the domain of n :

1) n (x) = $\frac{x}{x^2 + 2x} + \frac{x + 4}{x + 2}$

....

....

....

2)n (x)= $\frac{x}{x - 4} - \frac{x + 4}{x^2 - 16}$

....

....

....

3) n (x) = $\frac{x^2 + x}{x^2 - 1} - \frac{5 - x}{x^2 - 6x + 5}$

....

....

....

4) n (x) = $\frac{x - 6}{2x^2 - 15x + 18} - \frac{x - 5}{15 - 13x + 2x^2}$

....

....

....

5) n (x) = $\frac{3x + 15}{x^2 + 7x + 10} + \frac{2x^2 - 3x - 2}{x^2 - 4}$

....

....

....

Geel2000

6) n (x) = $\frac{x^2 + 3x + 2}{x^2 - 9}$ x $\frac{x - 3}{x + 2}$

....

....

7) n (x) = $\frac{x + 2}{x^2 - 4}$ x $\frac{2x - 4}{x - 3}$

....

....

8) n (x) = $\frac{x^2 + 2x - 3}{x + 3} \div \frac{x^2 - 1}{x + 1}$

....

....

9) n (x) = $\frac{x^3 - 8}{x^2 + x - 6} \div \frac{x^2 + 2x + 4}{2x + 6}$

....

....

10) n (x) = $\frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$

....

....

11) n (x) = $\frac{x^2 + 2x}{x^3 - 27}$ x $\frac{x^2 + 3x + 9}{x + 2}$ then find n(6) , n(-2)if it possible

....

....

....

....

Geel2000

2)Complete :

1) If $\frac{a}{b}$, $\frac{c}{d}$ are two algebraic fractions , then $\frac{a}{b}$ + $\frac{c}{d}$ = ……….

2) The domain of n : n (x) = $\frac{3\ x + 4}{x^2 + 25}$ + $\frac{x - 2}{x^2 + 7}$ is ……………………..

3)If : x ∈ R – { 2 } , then : $\frac{x}{x - 2}$ + $\frac{2}{2 - x}$ = ………………..

4)The additive inverse of the fraction : $\frac{x + 7}{x - 5}$ is ……………..

5)The function f where f (x) = $\frac{x - 2}{x - 5}$ has additive inverse if the domain is …………………………

6) If n(x) = $\frac{x^2 - 5x + 6}{5\ x}$, then the domain of n^{-1} is ……………….

7) If f (x) = $\frac{x - 2}{x + 1}$, then f^{-1} (2) is ………………

8) If n (x) = $\frac{x}{x - 5}$ + $\frac{3}{x - 5}$, then the domain in which the fraction n has a multiplicative inverse is R - …………

9) If the function n : n (x) = $\frac{2 - x}{x - 2}$ has a multiplicative inverse , then the domain of n is …………………

Geel2000

10)If the algebraic fraction $\frac{x - a}{x - 3}$ has a multiplicative inverse which is $\frac{x - 3}{x + 2}$, then a = …………

3)In each of the following find n (x) in the simplest form showing the domain of n :

1) n (x) = $\frac{2x + 6}{x^2 + x - 6} - \frac{x^2 - 6x}{x^2 - 8x + 12}$

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

2) n (x) = $\frac{3x^2 + 6x}{x^2 - 4} + \frac{6}{2 - x}$

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

3) n (x) = $\frac{3x - 15}{x + 3} \times \frac{4x + 12}{5x - 25}$

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

4)n (x) = $\frac{x^2 - 2x - 3}{5x - 135} \times \frac{5x^2 + 15x + 45}{x + 1}$

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

Geel 2000

4)find the answer of the following :

1)If : n(x) = $\dfrac{x^2 - 2x}{(x - 2)(x^2 + 2)}$

First : find n^{-1} (x) and identify its domain

Second : if n^{-1} (x) = 3 what is the value of x ?

2)If f(x) = $\dfrac{x^2 - 49}{x^3 - 8} \div \dfrac{x + 7}{x - 2}$, then find n (x) in the simplest form and

Identify its domain and find f(1)

3)If n (x) = $\dfrac{x^3 + 3x^2 + 2x}{x^2 + 2x}$ find n^{-1} (x) in the simplest form showing the domain of n^{-1} , then find n^{-1} (-2) if it is possible

4)Put the function f : f(x) = $\dfrac{3x + 6}{4x - x^2 + 5}$ x $\dfrac{x - x^2 + 20}{7x + 14}$ in the simplest form and identify its domain , then find if it is possible the value of f(-2) , f(2)

5)If f(x) = $\dfrac{x^2 - 2x - 15}{x^2 - 9} \div \dfrac{x^2 - 25}{x^2 - 3x}$ find f(x) in the simplest form showing the domain of f(a) = $\dfrac{1}{3}$ find the value of a

Geel2000

Model Exam on Unit two

1) **Choose the correct answer from the given ones**

(1) The function f where f(x) =$\frac{x-2}{x^3+27}$, then the domain of its multiplicative inverse is R – ………..

(a) {2} (b) {-3 , 2 } (c) {2 , -3 , 3} (d) { 3 , - 3}

(2) If the function f where f(x) =$\frac{x^2-9}{x}$,has a multiplicative inverse, then their common domain is ………..

(a) R – {0} (b) R – {0 , 3 } (c) R – {0 , 3 , -3} (d) R

(3)If N(x)=$\frac{x-1}{x-2}$, the domain of N $^{-1}$ (x) …….

(a) R (b) R – { 1 } (c) R – { 2 } (d) R – { 1 , 2 }

(4) the function f where f(x) = $\frac{x-2}{x-5}$, has a multiplicative inverse if its domain is ……..

(a) R (b) R – { 5 } (c) R – { 2 } (d) R – { 2 , 5 }

(5) the function f where f(x) = $\frac{x-2}{x-5}$, has a multiplicative inverse if the domain is ……..

(a) R– { 2 } (b) R – { 5 } (c) R – { - 2 , 2 } (d) R – { 0 , 1 }

(6)If N(x)=$\frac{1}{x}-\frac{3}{x}$, then N $^{-1}$ (x) = …….

(a) x - $\frac{x}{3}$ (b) $\frac{2}{x}$ (c) $\frac{-x}{2}$ (d) $\frac{x}{2}$

(7) The domain of the function f where f(x)=$\frac{x(x+2)}{x^2-4}$ is ……..

(a) R (b) R – { -2 , 2 } (c) R – { 2 , 0 } (d) R – { 2 }

Geel 2000

(8) The domain of the function f where f(x)=$\frac{x-3}{2}$ is ……..

(a) R (b) R –{0}(c) R – { -1 , 0 } (d) R – { 0 ,1 }

(9) The domain of the function f where f(x)=$\frac{x-7}{3(x+1)}$ is ……..

(a) R (b) R – { 1 } (c) R – { -1 , 3 } (d) R – { -1 }

(10) The domain of the function n where n(x)=$\frac{x-1}{x+2}+\frac{x-2}{x+1}$is…..

(a) R – { -1} (b) R – { -2}

(c) R – { -1 , -2} (d) R – { -1, -2 ,1 , 2 }

(11) If n(x) = $\frac{2x}{x^2-x+2}$, then n (-1) …….

(a) $\frac{-1}{2}$ (b) $\frac{1}{2}$ (c)$\frac{2}{3}$ (d) 2

(12) The function f where f(x) =$\frac{x+2}{x-2}$, then the domain of its multiplicative inverse is ………..

(a) R (b) R – { 2 } (c) R – { -2 } (d) R – { -2 , 2}

(13) The domain of the function n where n(x)=$\frac{x-2}{x+3}$ -$\frac{3x}{x-1}$ is…..

(a) R – { 0 , 2} (b) R – { -3 , 1} (c) R – { 2 , 3} (d) R – { -3 ,2 }

(14) The simplest form of the function n(x) $\frac{x}{x-3} \div \frac{3x}{x^2-9}$ is ...

(a) $\frac{x}{x-3}$ (b) $\frac{x}{x+3}$ (c)$\frac{x+3}{3}$ (d) $\frac{x-3}{3}$

(15) The domain of the multiplicative inverse of the fraction $\frac{x+7}{x-2}$ is ….

(a) R (b) R – { 2 } (c) R – { -7 } (d) R – { -7 , 2}

Geel 2000

(16) The additive inverse of the fraction $\frac{3}{x^2+1}$ is.......

(a) $\frac{-3}{x^2+1}$ (b) $\frac{x^2+1}{3}$ (c) $\frac{x^2+1}{-3}$ (d) $\frac{3}{x^2-1}$

(17) If f(x) = $\frac{x^2-9}{x+b}$, f(4) = 1, then b = ……

(a) - 7 (b) 7 (c) 3 (d) – 3

(18) If N(x)=$\frac{x-2}{x^2-x-6}$, then the domain of $N^{-1}(x)$ R – …….

(a) { 2 } (b) { -2, 3 } (c) { -2 , 2 } (d) { -2 , 2, 3 }

(19) The simplest form of the function n(x) $\frac{x+1}{x-1}+\frac{1-x}{x-1}$ $x \neq 1$ is …..

(a) zero (b) $\frac{2}{2x-2}$ (c) $\frac{2}{x-1}$ (d) $\frac{2}{(x-1)^2}$

(20) The set of zeroes of f where f(x) $=(x-1)^2(x+2)$ is…

(a) { 1 , 2 } (b) { 1 , -2 } (c) { -1 , 2 } (d) { -1 , -2 }

2) Answer the following questions

(1) Simplify each of the two algebraic

$n_1(x)=\frac{x^2-1}{x^2-x}$, $n_2(x)=\frac{2x-6}{x^2-5x+6}$

....

....

....

(2) Simplify the function where n(x)=$\frac{3x}{x^2-2x}-\frac{12}{x^2-4}$, showing its domain.

....

....

....

(3) Simplify the function where n(x)= $\frac{x^2-1}{x^2+3x+2}$ **-** $\frac{x^2-x}{x^2+2x}$ **,**
showing its domain.

....
....
....

(4) Find n in its simplest form where n(x) = $\frac{x}{4} + \frac{-2}{x+2}$ **,**
showing its domain.

....
....
....

(5) If the domain of the fraction n where n(x) = $\frac{b}{x} + \frac{9}{x+a}$ **is**
R –{ 0 , 4 } ,n(5)= 2 Find the value of a and b

....
....
....

(6) Find n in its simplest form where n(x) $\frac{3x^2+6x}{x^2-4} \times \frac{x-2}{2x+6}$ **,**
showing its domain.

....
....
....

(7)Find n in its simplest form where n(x) $\frac{x+3}{(x-2)(x+7)} \div \frac{2x+3x}{2x+14}$ **,**
showing its domain.

....
....
....

Geel 2000

(8) If $n_1(x)=\frac{x^2}{x^3-x^2}$, $n_2(x)=\frac{x^1+x^2+x}{x^4-x}$, prove that $n_1 = n_2$.

....

....

....

(9) Find n in its simplest form , showing its domain . where

1) $n(x) = \frac{x}{x+1} + \frac{2x^2}{x^3-x}$

....

....

....

2) $n(x) = \frac{x-1}{x^2-1} \div \frac{x^2-5x}{x^2-4x-5}$

....

....

....

(10) Find n in its simplest form where

$f(x) = \frac{3x^2-6x}{x^2-4} \times \frac{x^2+3x+2}{x^2+x}$

....

....

....

(11) Find the common domain of f_1 , f_2 to be equal such that:

$f_1(x) = \frac{x^2+x-12}{x^2+5x+4}$, $f_2(x) = \frac{x^2-2x-3}{x^2+2x+1}$

....

....

....

Geel2000

(12) Find n in its simplest form , showing its domain . where

1) $f(x) = \frac{x^2-x}{x^2-1} + \frac{x-5}{x^2-6x+5}$

....

....

....

2) $f(x) = \frac{x^3-1}{x^2-2x-1} \times \frac{2x-2}{x^2+x+1}$

....

....

....

(13) If $f(x)=\frac{x^2-49}{x^3-8} \div \frac{x+7}{x-2}$ **find f in its simplest form, showing its domain.Then calculate f(1).**

....

....

....

(14) Find the common domain of f_1 **,** f_2 **to be equal such that:**

$f_1(x) = \frac{x^2+3x+2}{x^2-4}$, $f_2(x) = \frac{x^2-1}{x^2-3x+2}$

....

....

....

(15) Find n in its simplest form , showing its domain . where

$f(x) = \frac{3x}{x^2-x-2} + \frac{x-1}{1-x^2}$

....

....

Geel 2000

Unit 3 : Operations on events

1- Complete the following

(1) The two events are said to be mutually exclusive if

A ∩ B = ………

(2) If the probability that the event A occurs is 75%, the probability of non occurrence of this event is …….

(3) If A is an event, P(A) = 0 then A is………

(4) If A' is the complement event of A then A∪ A' = ….. ,

A ∩A' = …..

(5) The probability of the sure event equals …….

(6) The probability of the impossible event equals …….

(7) When a regular die is tossed once, then the probability of getting an even number is …….

(8) When a regular die is tossed once, then the probability of getting a head is….

(9) If A , B are two mutually exclusive events, P(A) = 0.2 ,

P(B) = 0.3 then P(A∪ B) = ……….

(10) If A ,B are two mutually exclusive events of a random experiment ,P(A∩B) =………..

(11) If A⊂ S of a random experiment, P(A) = P(A')

Then P(A) = ….

(12) (10) If A ,B are two mutually exclusive events of a random experiment,

P(A)= $\frac{1}{4}$ **, P(A∪ B) =** $\frac{5}{12}$ **then P(B) = …….**

Geel 2000

2]Find the result in each:

1]If A and B are two events in the sample space for a random experiment Where P (A′) = 0.7 , P (B) = 0.6 and P (A ∪ B) = 0.9 , **then find :**

1) **P(B)** …………………………………………………………………

2) **P (A∩ B)**……………………… ……………………………………..

2]If A and B are two events in the sample space of a random experiment and there is : P (A) = $\frac{1}{3}$, P (B) = $\frac{1}{2}$,
P (A ∩ B) = $\frac{1}{5}$**Find :** P (A ∪ B)

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

3]A ball is drawn randomly from 25 identical balls of the same volume and weight , 10 of them are red , 8 are white and the rest are green .**Find the Probability that the drawn ball is :**1) white 2)green or white

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

4]If A , B are two events from a sample space of a random experiment ,
And P(A) = 0.8 , P(B′) = 0.3 , P(A ∪ B) = 0.9
Find: 1) P (A∩ B)…………………………………

2) P (B - A)…………………………

Geel2000

5] A card is drawn randomly from 30 identical cards numbered from 1 to 30 , find the probability that the number on the drawn card is :

First : Divisible by 4 …………………….. **second :** A prime number ………..

6]A ball is drawn randomly from 25 identical balls of the same volume and weight , 10 of them are red , 8 are white and the rest are green , find the
Probability that the drawn ball is :
First : White …………. **second :** Green or white ……….. **Third : not green**……

7]If A , B are two events in a random experiment ,
$P(A) = 0.7$, $P(B) = 0.6$ and $P(A \cap B) = 0.4$ **Find the probability of :**
1)Non occurrence of the event A
2)Occurrence of one event without the other .
……………………………………………………………………………………………
……………………………………………………………………………………………
8]A classroom consists of 40 students , 30 of them play football , 20 play Basketball and 15 play football and basketball , if a student is chosen randomly . **Find :**
First : The probability that this student is playing one of the two games at least
……………………………………………………………………………………………
……………………………………………………………………………………………

Second : The probability that this student is playing only one of the two games .
……………………………………………………………………………………………
……………………………………………………………………………………………

9]If $P(A) = 4P(A')$, then $P(A) =$ …………

Geel 2000

Models Exams in Algebra and statistics

Model (1)

First: Complete the following

(1) If x is a negative number, the greatest number of the following: $5 + x$, $5 - x$, $5x$, and $\frac{5}{x}$ is ………

(2) If $x \in R- \{0,1\}$, then $\frac{1-x}{x} \div \frac{x-1}{x}$ in the simplest form equals………

(3) If A ,B are two events in a random experiment, and $B \subset A$, then $P(A \cap B)$ = ….

(4) If the sum of two positive numbers is 4, and the sum of their squares is 10, Then the two numbers are ……..

(5) If the solution set of the equation $x^2 + mx + 9 = 0$ is {-3} , then m = …….

(6) If $n(x) = \frac{x+7}{x-2}$, then the domain of n^{-1} is ……..

Geel 2000

Second: Choose the correct answer from the given ones

(1) the common domain of the two fractions $\frac{2}{x-3}$, $\frac{7}{x-6}$ is ………

(a) R (b) R – { 3 } (c) R – { 6 } (d) R – { 3 , 6}

(2) The probability of the impossible event equals ……..

(a) φ (b) zero (c) 1 (d) -1

(3) If 2x =1, then $\frac{1}{5}$x = ………

(a) $\frac{2}{5}$ (b) $\frac{1}{5}$ (c) $\frac{1}{10}$ (d) $\frac{1}{2}$

(4) If $x^2 - y^2 = 2(x + y)$ such that x + y ≠ 0 then

x – y = ……

(a) 2 (b) 4 (c) 6 (d) 8

(5) The set of zeroes of the function f where f(x) $=\frac{x-3}{x+2}$ is ……..

(a) {zero} (b) { 3 } (c) { -2 } (d) { 3 , -2}

(6) The solution set of the two equation: - 2y = 1 , 3x +y = 10 is ………

(a) {(5 , 2)} (b) {(3 , 1)} (c) {(4 , 2)} (d){(3 , 1)}

Geel 2000

[3](a) solve the equation $3x^2 = 5x + 4$ approximate to the nearest two decimals

(b) Find n in the simplest form showing its domain where

$$n(x) = \frac{x^2 + 2x + 4}{x^3 - 8} + \frac{x^2 + x - 2}{x^2 - 4}$$

[4] (a) Graph the function f where f(x) = $x^2 - 2x + 1$ over the interval [-2, 4] then from the graph find the solution of the equation $x^2 - 2x + 1 = 0$

(b) if $n(x) = \frac{x^2 + 3x}{x^2 - 9} + \frac{2x}{x+3}$ find n in its simplest form showing its domain.

[5] (a) Find the solution set y = x – 3 , $x^2 + y^2 = 17$

(b) A card is drawn randomly from 30 identical cards numbered from 1 tp 30, find that the probability that the number on the drawn card is

(1) divisible by 4

(2) prime number

Geel 2000

Model (2)

[1]Complete the following:

(1) if x = 2 , y = 3 , then $(y - 2x)^{10}$ = ……..

(2) If x ∈ R- {0,3} , then $\frac{x}{x-3} \div \frac{x}{3-x}$ = …….. in its simplest form

(3) If A ,B are two events in a random experiment, and A ⊂ B, then P(A∪B) = ….

(4) If x – y = 3 , x + y = 9 , then y = ……..

(5) the common domain of two fractions $\frac{x}{x^2-1}$, $\frac{3}{x2+x}$ is ……..

(6) If {-2, 2} is the set zeros of the function f(x) = $x^2 + a$, then a = ……

[2]Choose the correct answer from the given ones

(1) If the sum of two numbers is 8, and their product is 15, then the two numbers are …….

(a) 2,6 (b) 3,5 (c) 4,4 (d) 1,15

(2) If the fraction $\frac{x-a}{x+5}$ is the multiplication inverse of $\frac{x+5}{x+3}$, then a = ……

(a) 3 (b) - 5 (c) - 3 (d) 5

(3) If a coin is tossed once, the probability that the head appears = …….

(a) 1 (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

(4) If x + y = 0 ,x^2 = 25 , then y = ……..

(a) 20 (b) - 5 (c) 5 (d) ± 5

Gael 2000

(5) If the two equations x + 3y = 6 , 2x + ky = 12 have an infinite number of
solutions , then k = …….

(a) 2 (b) 6 (c) 3 (d) 1

(6) If the probability that Hamdy succeeded is 95%, then probability that he
does not succeed is ……….

(a) 20% (b) 10% (c) 5% (d) zero

[3](a) solve the two equations: x – 2y = 1 , $x^2 - xy = 0$

(b) Find n in the simplest form showing its domain where

n(x) = $\frac{x-3}{x^2-7x+12} - \frac{4}{x^2-4x}$

[4](a) solve the equation $2x^2 - 5x + 1$ approximate to the nearest two decimals

(b) If n(x) = $\frac{x^2-3x+2}{x^2-1} \div \frac{3x-15}{x^2-4x-5}$ **Find n in the simplest form showing its domain.**

[5] (a) If the set of zeros of the function f where
f(x) =$ax^2 + bx + 8$ is {2,4},find the value of a and b

(b) A ball drawn randomly from 25 identical balls of the same volume and weight, 10 of them are red , 8 are white and the rest are green , find the
probability that the drawn ball is :

(1) White (2) Green or white (3) Not green

Geel2000

Model (3)

[1]Complete the following:

(1) If x ∈ R- { 2 } , then $\frac{x}{x-2}+\frac{x}{2-x}$ = …….. in its simplest form

(2) If x y = 3 ,$x^2y - xy^2 = 6$, then x - y = ……..

(3) If A ,B are two mutually exclusive events in a random experiment, then P(A ∩ B) = ….

(4) If the length of a rectangle is 3 cm. and its diagonal of length 4 cm. Then its width is ………. Cm

(5) If (5 , x – 4) = (y + 2 , 3) , then x + y = …….

(6) The common domain of two fractions $\frac{5}{x-3}$, $\frac{x+1}{x^2+3x}$ is …….

[2]Choose the correct answer from the given ones

(1) If x is aa negative number, then the greatest number is …

(a) 7 + x (b) 7 - x (c) 7x (d) $\frac{7}{x}$

(2) If n(x) = $\frac{x-1}{x+3}$, then the domain of n^{-1} is ……

(a) R – { -3 } (b) R – { 1 } (c) R – { 1,-3 } (d) { 1 ,-3}

(3) If a die is tossed once, then the probability of appearance of an odd number equals

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) 3

Geel 2000

(4) If the solution set of the equation: $x^2 - ax + 4 = 0$ is {- 2 }, then a = ……

(a) zero (b) - 1 (c) - 2 (d) - 4

(5) If the two equations x + 2y = 4 , 2x + ky = 11 represent two parallel lines

, then k = ……..

(a) 4 (b) - 4 (c) 1 (d) - 1

(6) If the solution set of the two equation: x – y = 0 , xy = 16 is..

(a) {(0 , 0)} (b) {(4, 4)} (c) {(-4 , -4)} (d){(4 , 4), {(-4 ,-4)}

[3] (a) Find n in the simplest form showing its domain where

$$n(x) = \frac{x^3 - 8}{x^2 + x - 6} \times \frac{x + 3}{x^2 + 2x + 4}$$

(b) Find the solution set of the equation $(x - 3)^2$ – 5x = 0 approximate to the nearest two decimals.

[4] (a) If $n(x) = \frac{x+5}{x^2+7x+10} - \frac{x-1}{x^2+5x+6}$, find n in the simplest form showing its domain , find n(-2)

(b) Find the solution set of the two equations: x – y = 4 ,

3x + 2y= 7 Graphically then verify algebraically.

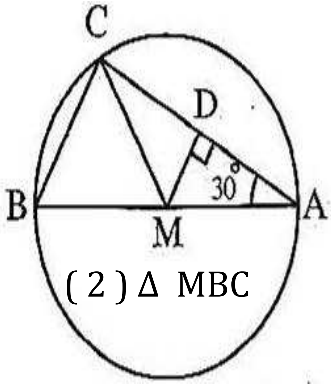
[5] (a) Graph the function f where f(x) = 4x - x^2- 3 on the interval [0,4]. Find the

Geel 2000

Unit 4 Lesson 1 : Basics on circle

1- Complete the following:

1. **If one end of a line segment lies on the center of the circle and the other end on the circle, then this line segment is called ………**
2. **If the two ends of a line segment lie on the circle, then this line segment is called …………….**
3. **The chord which passes through the center of the circle is called ……..**
4. **The straight line which passes through the center of the circle is called ……..**
5. **The longest chord of the circle is called ………**
6. **The circle has ……. Number of axes of symmetry.**
7. **In any circle the perpendicular straight line on any chord its mid – point is ………… to the circle**
8. **The circle divides the plane into ……… sets of points**



<u>2- In the opposite figure :</u>

$\overline{AB}$ is a diameter of a circle M , $\overline{AC}$ is a chord

$\overline{MD} \perp \overline{AC}$, m ($\angle A$) = 30° **Prove that :** (1) $\overline{MD} // \overline{BC}$ (2) Δ MBC is an equilateral triangle

……………………………………………………………………………………………

……………………………………………………………………………………………

………………………………………………………………………………………………………

GEEL2000

3- In the opposite figure :

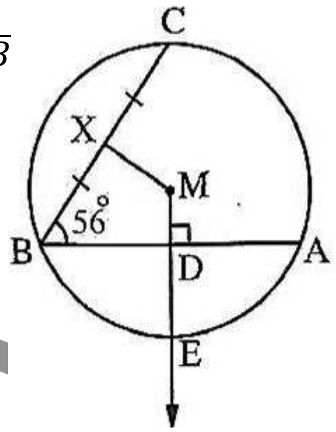
$\overline{AB}$ and $\overline{BC}$ are two chords in circle M

Which has radius length of 5 cm , $\overrightarrow{MD} \perp \overline{AB}$ intersects $\overline{AB}$

At D and intersects the circle M at E ,

X is the midpoint of $\overline{BC}$, AB = 8 cm , m($\angle ABC$) = 56°

Find : 1) m ($\angle DMX$) 2)length of $\overline{DE}$



....

....

....

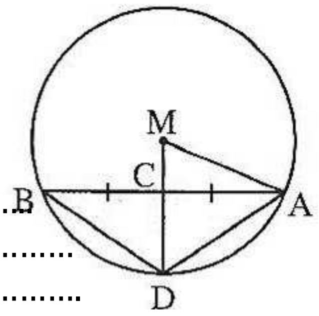
....

4- In the opposite figure :

M is a circle of r = 13 cm , $\overline{AB}$ is a chord of length 24 cm

C is the midpoint of $\overline{AB}$ and $\overrightarrow{MC} \cap circle\ M$ = { D }

Find : The area of Δ ADB



....

....

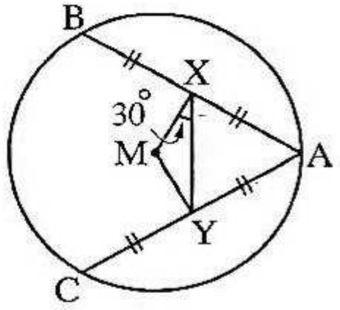
....

5- In the opposite figure

AC = AB , X is the midpoint of $\overline{AB}$,

Y is the midpoint of $\overline{AC}$, m($\angle MXY$) = 30°

Prove that : The triangle AXY is equilateral Δ



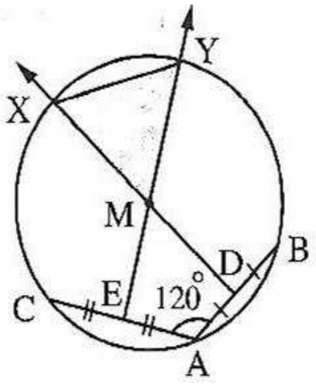
....

....

....

6)In the opposite figure :

Prove that : The triangle XYM is an equilateral Δ



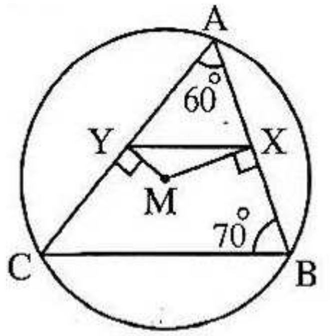
....

....

....

....

<u>7)In the opposite figure :</u>



In circle M , $\overline{MX} \perp \overline{AB}$, $\overline{MY} \perp \overline{AC}$

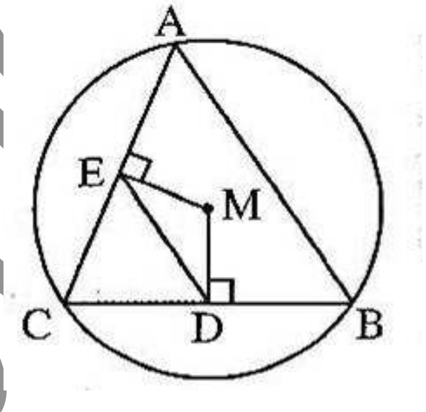
m(∠ A) = 60° and m (∠ B) = 70°

Find :The measures of the interior angles

Of the triangle MXY

……………………………………………………………………………….
……………………………………………………………………………….
……………………………………………………………………………….
…………………………………………………………………………………

<u>8)In the opposite figure :</u>



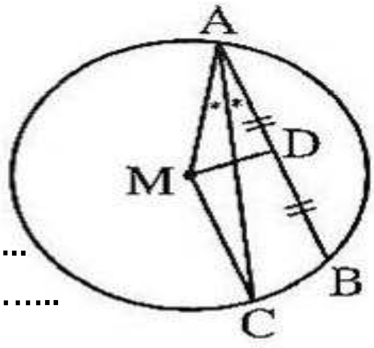
$\overline{MD} \perp \overline{BC}$ and $\overline{ME} \perp \overline{AC}$ **Prove that :**

1)$\overline{ED} // \overline{AB}$

2)The perimeter of Δ **CDE** = $\frac{1}{2}$ the perimeter of Δ **ABC**

……………………………………………………………………………………………
…………………………………………………………………………………………..
…………………………………………………………………………………………..

<u>9)In the opposite figure:</u>



$\overline{AB}$ is a chord of circle M , $\overrightarrow{AC}$ bisects ∠ BAM

And intersects circle M at C

If D is the midpoint of $\overline{AB}$ **Prove that :**$\overline{DM} \perp \overline{CM}$

………………………………………………………………………………..
…………………………………………………………………………………..
…………………………………………………………………………………..
…………………………………………………………………………………..

Geel 202

Unit 4 **Lesson2 :** Position of a point & straight line with respect to circle

1)Complete:

1) The St. line which is drawn ⊥ to a diameter of a circle at one of its endpoints is …….

2) The two tangents to a circle at the two endpoints of a diameter of it are…………….

3) If M is a circle with circumference 8π cm , A is a point on the circle , then MA = ……… cm

4)If the St. L is a tangent to the circle whose length of diameter is 8 cm , then the St. is at a distance ………. cm from its centre.

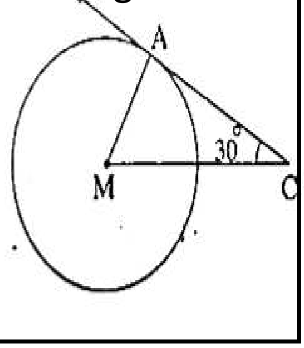
5) M is a circle of radius length 5 cm A is a point on the circle where MA =(2 x + 1) cm then x = …..

6) If the area of the circle M is 16π cm^2 , A is a point in its plane where MA = 8 cm , then A lies ……………. The circle M

7)M is a circle with diameter of length 8 cm If the St. line L is outside the circle , then the distance between the centre of the circle and the St. line L ∈ ………………….

8)If M is a circle with radius length 7 cm , $\overline{MA} \perp$ L where A ∈ L , if the St. line L intersects the circle M and MA = 3 x – 5 , then x ∈ …………….
And if the St. line L is a tangent to the circle M and MA = x^2 - 2 , then x ∈ ………………..

9) $\overleftrightarrow{CA}$ touches the circle M at A , m ($\angle ACM$) = 30° If the radius length of the circle M = 4 cm , then MC = ………. Cm



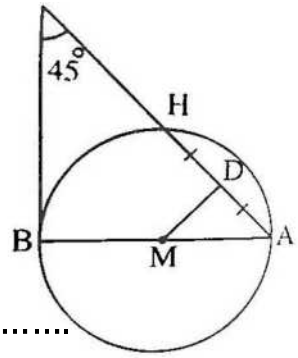
Geel2000

2- In the opposite figure :

$\overrightarrow{BC}$ is a tangent at B , m ($\angle C$) = 45° ,

D is the midpoint of $\overline{AH}$

Prove that : DA = DM



……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

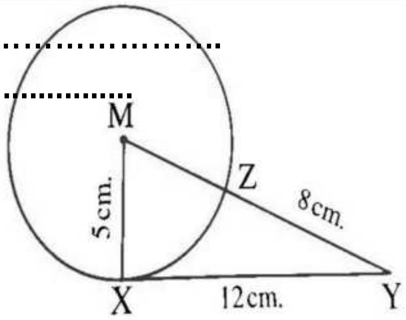
……………………………………………………………………………………………

3- In the opposite figure :

M is a circle with radius length 5 cm ,

XY = 12 cm , $\overline{MY} \cap circle\ M$ = { Z }

And ZY = 8 cm **Prove that :** $\overleftrightarrow{XY}$ ***is a tangent to the circle M at X***



……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

4- $\overline{AB}$ is a diameter in a circle of area 36 π cm² , $\overleftrightarrow{BC}$ is drawn a tangent to the circle at B , if m ($\angle ACB$) = 60° , then calculate the area of Δ ABC ?

……………………………………………………………………………………………

……………………………………………………………………………………………

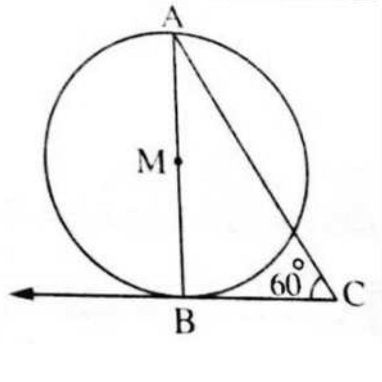
……………………………………………………………………………………………

……………………………………………………………………………………………

5- In the opposite figure :

Find the length of $\overline{BC}$, B C = 44 cm , $\pi = \frac{22}{7}$

Find Area & circumference of the circle ?



……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

6)Choose the correct answer :

1) If the point A is in the plane of the circle M whose radius length = r and if 0 < MA < r , then A lies …………………

[on , inside , outside , axis of symmetry]

2) A circle with diameter length 2 x cm , the St. line is at a distance (x + 1)cm from its center , then the St . line L is………………

[tangent , secant , outside , axis of symmetry]

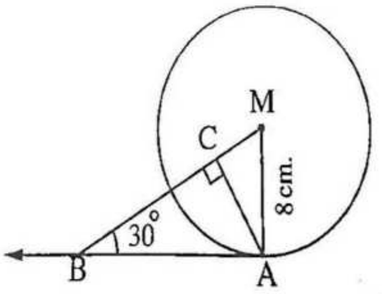
3)If the diameter length of a circle is 8 cm and the St. line L is at distance of 3 cm from its center , then the St. line L is……………..

[tangent , secant , outside , axis of symmetry]

4)A circle is of a circumference 6 π cm , and the St. L is distant from its center by 3 cm , then the St. line L is ……..

[tangent , secant , outside , axis of symmetry]

7)In the opposite figure :



M is a circle ,$\overleftrightarrow{AB}$ is a tangent to the circle at X

MA = 8 cm , m (∠ ABM) = 30° and $\overline{AC} \perp \overline{MB}$

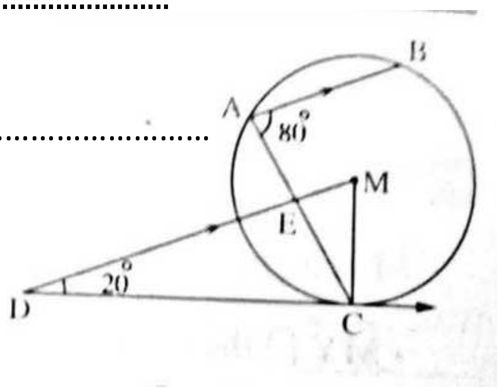
Find : The length of each of $\overline{AB}$ and $\overline{AC}$

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

8)In the opposite figure :



Find the m(∠ECM)

………………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

……………………………………………………………………

…………………………………………………………

Geel2000

Unit 4 **Lesson3:** Position of a circle with respect to another circle

1)Complete

1)If the surface of the circle M ∩ the surface of the circle N = ∅ , then the two circles M and N are ………………………..

2) If the surface of the circle M ∩ the surface of the circle N = { A } , then the two circles M and N are ………………………..

3) The centres line of two intersecting circle is perpendicular to ……….. and ………..

4)The centres line of two Touching circles is perpendicular to ………………..

5) M and N are two circles touching internally , their radii lengths are 7 cm and 5 cm then MN = ……………… cm

6) M and N are two circles of radii lengths are 9 cm and 4 cm respectively , MN = 5 cm , then the two circles are……………………

7) M and N are two circles , their radii lengths are 8 cm and 3 cm , if MN = 11 cm , then the two circles M and N are ………………………………

8) M and N are two circles , their radii lengths are 4 cm and 3 cm , if MN = 9 cm , then the two circles M and N …………….

2- M and N are two intersecting circles at A and B , MA = 12 cm , NA = 9 cm and MN = 15 cm . **Find : The length of $\overline{AB}$?**

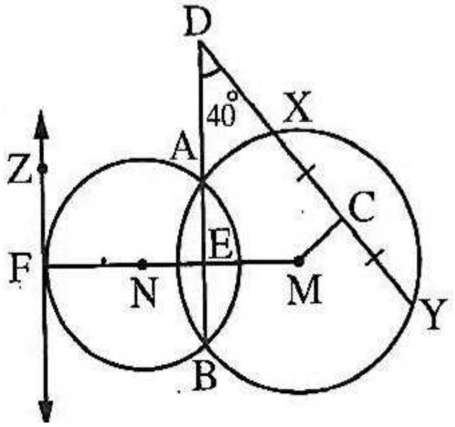
……

……

………………………………………………………………………………

Geel 2000

3- In the opposite figure :



M and N are two intersecting circles at A and B ,
C is the midpoint of $\overline{XY}$, m(∠ D) = 40 ° ,
$\overleftrightarrow{FZ}$ is a tangent to the circle N at F where
$\overleftrightarrow{MN} \cap \overleftrightarrow{FZ} = \{ F \}$

1)Find : m(∠ CME) **2)Prove that : $\overleftrightarrow{FZ} // \overline{AB}$**

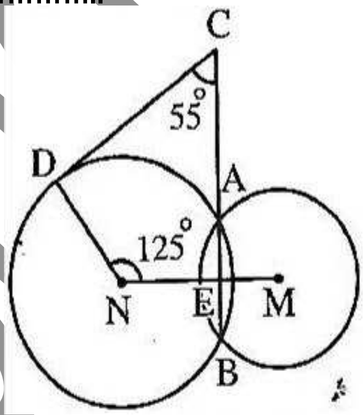
……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

4- In the opposite figure :



M and N are two intersecting circles at A and B ,
C ∈ $\overrightarrow{BA}$, D ∈ the circle N , m (∠ MND) = 125°
m (∠ BCD) = 55° ,

Prove that : $\overleftrightarrow{CD}$ is a tangent to circle N at D

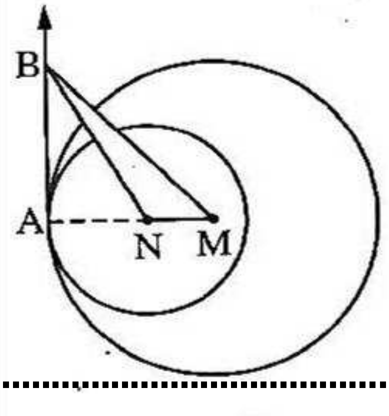
……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

5- In the opposite figure :



M and N are circles with radii lengths of 10 cm
And 6 cm respectively and
they are touching internally at A ,
$\overleftrightarrow{AB}$ is a common tangent for both . If the area of
Δ BMN = 24 cm², **Find : The length of $\overline{AB}$**

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

Geel 202

6)Complete:

1)If the radius length of the circle M = 3 cm and the radius length of the circle N = 5 cm , MN = 6 cm , then the two circles M and N are ………………………….

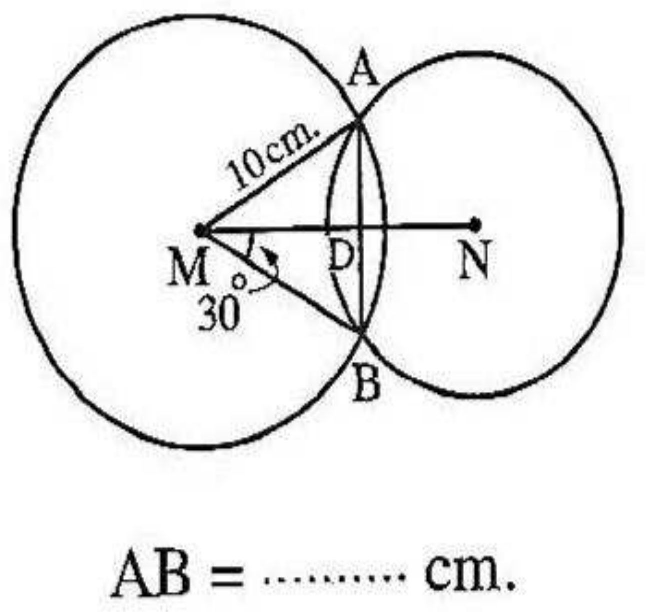
2)M and N are two intersecting circles their radii lengths are 3 cm and 5 cm respectively , Then MN∈ …………………..

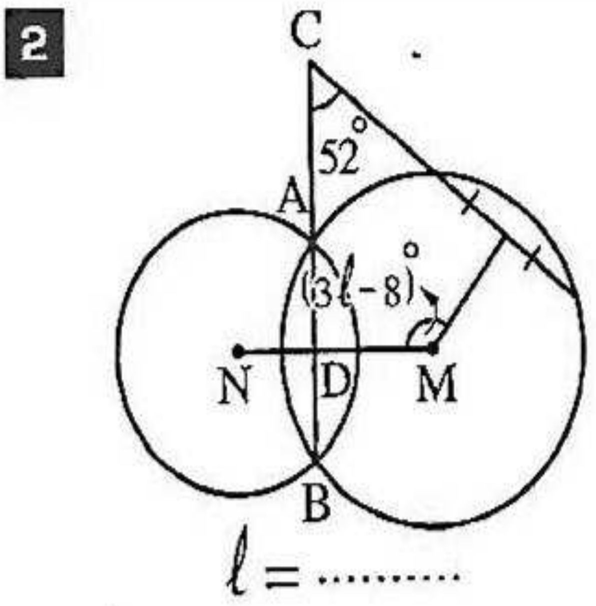
3)If the radius length of the circle M = the radius length of the circle N = MN , then the two circles are ……

3)M , N and L are 3 circles touching externally two – by – two , their radii length are 5 cm , 6 cm and 4 cm , then the perimeter of the triangle MNL = …………………..

4)M is a circle of radius length 4 cm , touches the circle N externally . If MN = 7 cm , then the circumference of the circle N = ………………… π cm

7)In the opposite figures :





Unit 4 Lesson4: Identify the circle

1) Complete :

1) It is possible to draw ……….. passing through a given point .

2) The number of circles which passes through two given points is …………..

3) The number of circles which passes through three collinear points is ………

4) The number of circles passing through three non-collinear points is ……….

5)The center of the circumcircle of a triangle is the point of intersection of …………………………………..

6)IfΔABC is right – angled at B , then the center of its circumcircle is …………

7)It is impossible to draw a circle passing through the vertices of ……………..

2)Use the graph copy book to draw :

1)Draw$\overline{AB}$ with length = 4 cm , then draw a circle passing through the two Points A and B with radius length = 3 cm .How many solutions can be obtained?

2)Draw$\overline{AB}$ with length = 6 cm , then draw a circle passing through the two Points A and B with radius length = 4 cm .How many solutions can be obtained?

Geel 2000

3- Complete :

1- If the number of circles can be drawn passing through two given points in the plane equals …………

2- If two circles have three common points, then they are ………

3- The radius of the smallest circle drawn to pass through two given points in the plane equals ……….

4- The point of intersecting of the symmetric axes of the sides of a triangle is ………….

5- If M is a circle of radius r, A is a point in the plane of the circle:

(a) If MA = $\frac{1}{2}$ R then A …….. the circle

(b) If MA = R then A …….. the circle

(c) If MA = 3R then A …….. the circle

4)Use the graph copy book to draw :

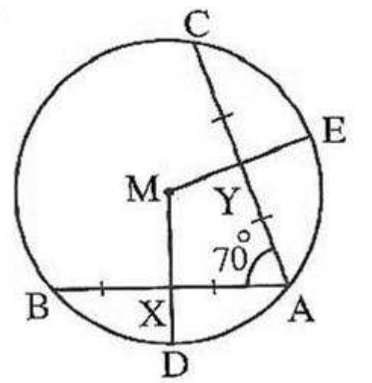
1)Draw the right – angled triangle ABC at B where AB = 4 cm , BC = 3 cm , then draw the circumcircle of this triangle . Where does the center of the circle lie
With respect to the sides of this triangle ?

2)Draw the isosceles triangle ABC in which m($\angle ABC$) = 120° , BC = 4 cm .Determine the center of the circumcircle of it and find its radius length .
3)Draw the equilateral triangle ABC of side length of 6 cm ,Draw the circumcircle of this triangle ABC and located the position of the center of the circle .

Geel 2000

Unit 4 **Lesson5:** Relation between chords & centre of circle

1- **<u>In the opposite figure :</u>**



$\overline{AB}$ and $\overline{AC}$ are two chords equal in length in the circle M,

m (∠ CAB) = 70° , X is the midpoint of $\overline{AB}$,

Y is the midpoint of $\overline{AC}$

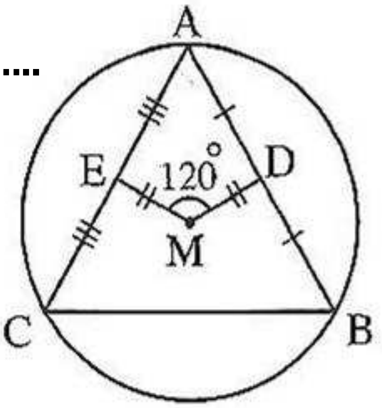
Find: 1) m (∠ DME)

2)Prove that: XD = YE

……………………………………………………………………………

……………………………………………………………………………

<u>2)In the opposite figure :</u>



Δ ABC is inscribed in the circle M

If DM = EM , m (∠ DME) = 120°

Prove that :Δ ABC is an equilateral Δ

……………………………………………………………………………

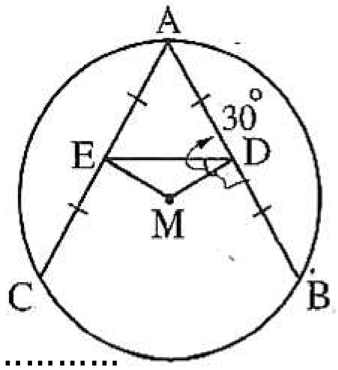
……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

<u>3)In the opposite figure</u>



AB = AC , D and E are the midpoints of

$\overline{AB}$ *and* $\overline{AC}$ respectively , m (∠ MDE) = 30°

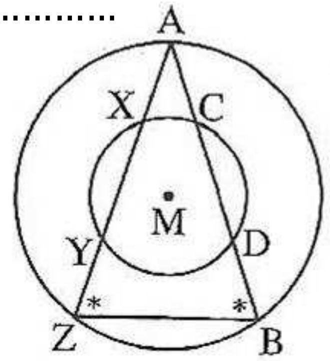
Prove that:

MDE is an isosceles Δ 2)ADE is an equilateral Δ

……………………………………………………………………………

……………………………………………………………………………

<u>4)In the opposite figure :</u>



Provethat: CD=XY

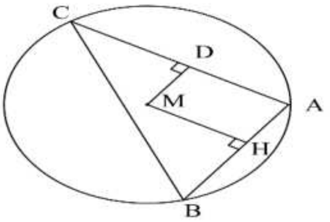
……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

Geel20

5) In the opposite figure



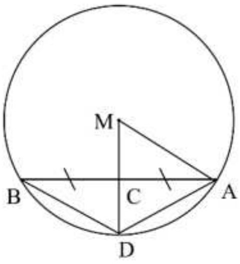
ABC is a triangle in a circle of center M,

$\overline{MD} \perp \overline{AC}$, $\overline{ME} \perp \overline{AB}$ and

BC = 8 cm Find DH

....
....
....

6) In the opposite figure



M circle of center M, its radius of length 13 cm

$\overline{AB}$ is a chord of length 24 cm,

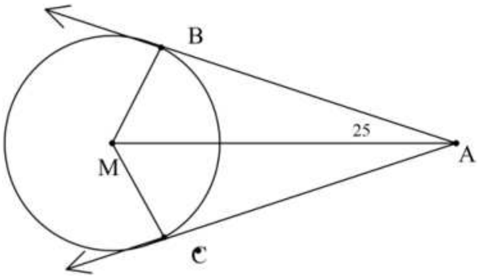
C is the mid point

Of $\overline{AB}$, $\overline{MC}$ cuts the circle at D. Find :

[1] The length of $\overline{MC}$ [2] the area of Δ ADB

....
....
....

7) In the opposite figure



$\overrightarrow{AB}$ and $\overrightarrow{AC}$ are two tangent to the circle M,

Touch it at B, C respectively

and m(∠BAM)=25°

[1] prove that $\overrightarrow{MA}$ bisects (∠BMC) [2] find (∠BMC)

....

Geel 2000

General Exercise on Unit four

1- **choose the correct from the given ones :**

1) If the length of a diameter of a circle is 7 cm, and the straight line L at distant 3.5 cm from its centre , then L is ……..

a) Secant to the circle at two points b) Lies outside circle

c) Tangent to the d) Axis of symmetry to the circle

2) If the point A belongs to the circle M of diameter 6 cm, then MA equals.

(a) 3 cm (b) 4 cm (c) 5 cm (d) 6cm

3) If the straight line L is a tangent to the circle M of diameter 8 cm, then the distance between L and its centre equals ……..

(a) 3 cm (b) 4 cm (c) 6 cm (d) 8 cm

4) If the straight line L is outside a circle of radius 3 cm, and its center M, if L at distance X from its centre, then x∈ ……..

(a)] 3, ∞ [(b) [3, ∞ [(c)] 6, ∞ [(d)]−∞, −6 [

5)If the straight line L at distance X from a circle of centre M and radius R,

X ∈] 0 , R[, then L ……….

a) Intersects the circle b) Touches the circle

c) Lies outside the circle d) Passes through the centre of the circle

6) If the length of the perpendicular drawn from the centre of the circle on the straight line L equals 6 cm and the radius 6 cm, then L ……..

a) Intersects the circle b) Touches the circle

c) Lies outside the circle d) Passes through the centre of the circle

Geel2000

7) Which of the following points does not belong to the centre that its centre is the origin and its radius 7 cm?

a) (0 , 7) **b) (0 , -7)** **c) (7 , 0)** **d) (7 , 7)**

8) If the surface of the circle M∩ the surface of the circle N={A}, then the two circles M and N are ………

a) Distant **b) Concentric**

c) Touching externally **d) Intersecting**

9) The number of circles can be drawn to pass through the end points of the line segment $\overline{AB}$ equals ………

a) 1 **b) 2** **c) 3** **d)an infinite number**

10) If the circle M∪ the circle N={A,B}, then the two circles M and N are……..

a) Distant **b) Concentric**

c) Touching externally **d) Intersecting**

Geel2000

11) If the two circles M,N are touching externally, the radius of one of them 5cm, and MN = 9 cm, then the radius of the other circle equals …….

(a) 3 cm **(b) 4 cm** **(c) 7 cm** **(d) 14 cm**

12) If the two circles M,N are touching internally, the radius of one of them 3 cm, and MN = 8 cm, then the radius of the other circle equals …….

(a) 5 cm (b) 6 cm (c) 11 cm (d) 12 cm

13) M and N are two intersecting circles their radius are 5 cm, 2cm, then MN= …….

(a)] 3, 7[(b) [3, 7 [(c)] 3, 7] (d) [3 , 7]

14) The number of circles that pass through three collinear points equals …..

(a) zero (b) One (c) Three (d)An infinite number

15) The symmetric axis of the common chord $\overline{AB}$ to the two intersecting circles M , N is …………….

(a) $\overleftrightarrow{MA}$ (b) $\overleftrightarrow{MB}$ (c)$\overleftrightarrow{MN}$ (d) $\overleftrightarrow{NA}$

16) the centres of the circles which pass through the two points A , B lie on …...

a) The axis of $\overline{AB}$ b) $\overline{AB}$

c) The perpendicular to $\overline{AB}$ d) The perpendicular on $\overline{AB}$ at B

17) Number of the circle which pass through three non collinear points equals……….

(a) zero (b) one (c) two (d)three

Geel2000

18) The centre of the circum circle of any triangle is the point of intersecting of
its ………..

a) Interior bisectors of its angles

b) Exterior bisectors of its angles

c) its height

d) The symmetric axis of its sides

19) If the two points A , B lie on a plane AB= 4cm, then the length of the radius
of the smallest circle passes through A and B equals ………

(a) 2 cm (b) 3 cm (c) 4 cm (d) 8 cm

20) If the two points A , B lie on a plane AB= 6cm, then the number of circles of each of them has a radius of 5 cm and passes through A and B equals…...

a) zero b) 1 c) 2 d) an infinite number

2: Match from the column (X) to the column (Y) to get a true statement

Two circles of radius cm. & 6 cm

X	Y
1) If MN = 1 cm	a) M , N are two intersecting circles
2) If MN = 2 cm	b) M , N are two distant circles
3) If MN = 7 cm	c) M , N are two touching externally
4) If MN = 14 cm	d) M , N are two interior circles
5) If MN = 15cm	e) M , N are two touching internally

Geel 2000

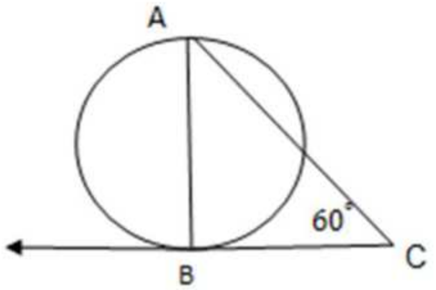
3- in the opposite figure

A circle of circumference 44 cm,

$\overline{AB}$ is a diameter

$\overleftrightarrow{BC}$ is a tangent at B , and m ($\angle C$) = 60°

Find the length of $\overline{BC}$ ($\pi = \frac{22}{7}$)



....
....
....
....

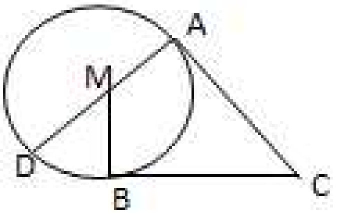
4- In the opposite figure

$\overline{AD}$ is a diameter in a circle M,

$\overrightarrow{CA}$ and $\overrightarrow{CB}$ are two tangent

to the circle M, touch it at B, C respectively.

Prove that m ($\angle$DMB) = m ($\angle$ACB)



....
....
....
....

Geel 2000

5- In the opposite figure

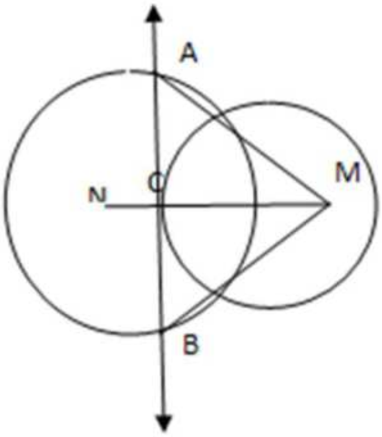
M, N are two intersecting circles,

$\overline{MN}$ intersects the circle

M at C, $\overline{CA}$ is a tangent to the circle M at C,

and cuts the Circle N at A, B Prove that:

[1] CA = CB [2] MA = MB



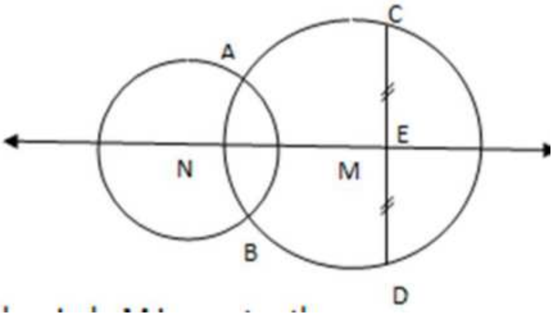
6- In the opposite figure

M, N are two intersecting circle,

$\overline{CD}$ is a chord in the circle M,

cuts $\overleftrightarrow{MN}$ at E, if E is the mid point

of $\overline{CD}$ Prove that: $\overline{AB}$ // $\overline{CD}$



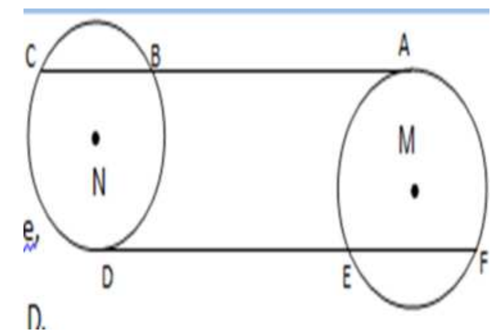
7) M, N are two touching internally circles at A, the circle M is greater than circle N, draw the common tangent $\overleftrightarrow{AC}$, then draw $\overleftrightarrow{NM}$ to cut the circle N at B, and draw the tangent $\overleftrightarrow{BD}$ to the circle N to cut the circle M at D, E Prove that:

[1] $\overleftrightarrow{AC}$ // $\overleftrightarrow{BD}$ [2] BD =BE.

………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………

8) In the opposite figure

M, N are two congruent circles, $\overline{AC}$ is a tangent to the circle M at A the, $\overline{DF}$ is a tangent to the circle N at D, $\overline{AC}$ // $\overline{DF}$. Prove that:



[1] BC = FE [2] AB = ED

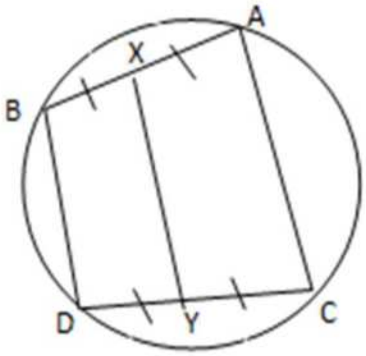
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………

9) In the opposite figure

$\overline{AB}$, $\overline{CD}$ are two chords (equal in length)

if X,Y are the two mid points of $\overline{AB}$, $\overline{CD}$

respectively Prove that



[1] $\overline{AC}$ // $\overline{BD}$ [2] m $(\angle BXY)$ = m $(\angle DYX)$

....

....

....

....

....

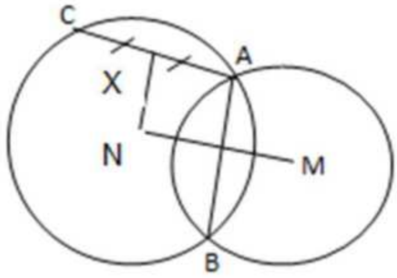
10) In the opposite figure

M, N are two intersecting circles at A, B,

$\overleftrightarrow{MN} \cap \overline{AB}$ = {Y}, AB = AC, if

X is the mid point of $\overline{AC}$.

Prove that: NX = NY.



....

....

....

....

Geel 2010

11) $\overline{AB}$, $\overline{CD}$ are two parallel chords in a circle M, E is the midpoint of $\overline{AB}$, $\overrightarrow{EM}$ is drawn to cut $\overline{CD}$ at F.

Prove that: FC = FD

....
....
....

12) A, B are two points where AB = 6 cm, Draw a circle of radius 5 cm and passes through the two points A, B. Find the distance from the centre to $\overline{AB}$.

....
....
....
....
....
....

13) Draw the triangle ABC in which AB = 6 cm, AC = 4 cm, m $(\angle BAC)$ =60° . Then draw a circle passes through the two points A, C and its center $\in \overline{AB}$.

....
....
....
....
....
....

Geel 2000

14) $\overline{AB}$ is a diameter in a circle M, $\overline{AC}$ is a chord such that m $(\angle BAC)$ = 30°, then draw , $\overline{BC}$ and , $\overline{MD} \perp \overline{AC}$ to cut it at D. Prove that:

[1] $\overline{MD}$ // $\overline{BC}$

[2] BC = the length of the radius of this circle.

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

Geel 2000

Unit 5 Lesson 1 :Central angles

1)Complete:

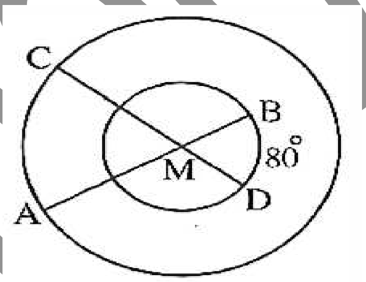
1)If a square ABCD is inscribed in a circle M , then $m(\overset{\frown}{AB})$ = ……………

2)The circumference of a circle = 36 cm ,then the measure of an arc of it with length = 6 cm is …………………°

3)An arc in a circle , its length = $\frac{1}{3}\pi$ r , then it is opposite to a central angle of measure ……..

4)The measure of the arc which represents $\frac{1}{3}$ the circumference of the circle = …………..

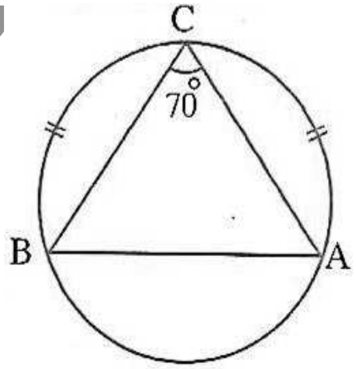
5)In the opposite figure : $m(\overset{\frown}{AC})$ = ……….°



2)In the opposite figure :

Find : m (∠ ABC)

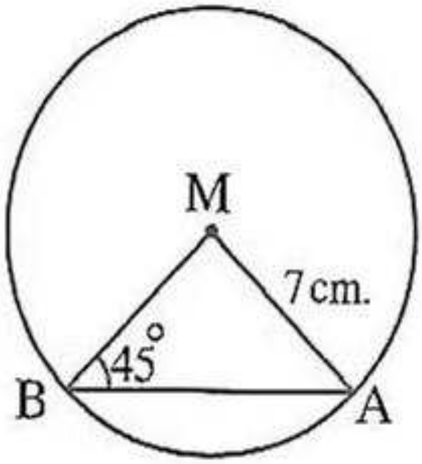
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………



3)In the opposite figure :

Find the length of : $\overset{\frown}{AB}$ $(\pi = \frac{22}{7})$

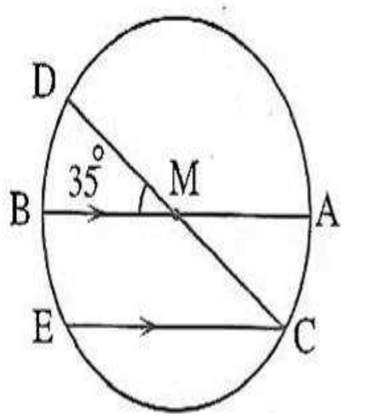
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………



4)In the opposite figure :

Find : m ($\overset{\frown}{BE}$)

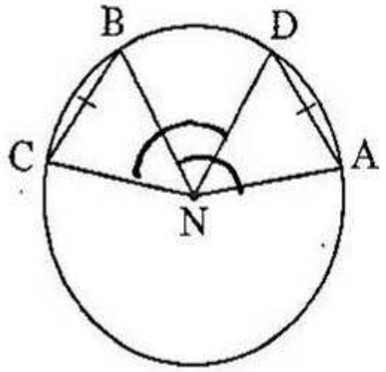
....
....
....
....



5)In the opposite figure :

Prove that : m (∠ ANB) = m (∠ CND)

....
....
....
....

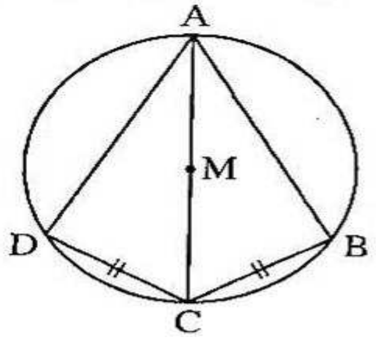


Geel 2000

6)In the opposite figure :

Prove that : m ($\overset{\frown}{AB}$) = m ($\overset{\frown}{AD}$)

....
....
....

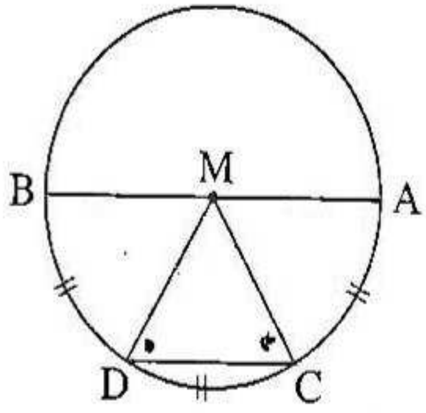


7)In the opposite figure :

Prove that :Δ MCD is equilateral

……………………………………………………………………

……………………………………………………………………



8)In the opposite figure:

AB is a diameter of circle M

m ($\overset{\frown}{AC}$) : m ($\overset{\frown}{DB}$) = 5 : 6

Find : m ($\overset{\frown}{ACD}$)

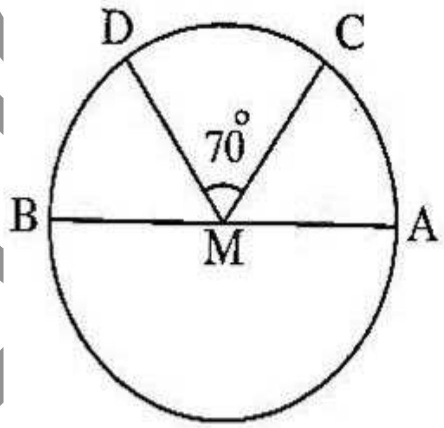
……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………



9)In the opposite figure :

$\overleftrightarrow{CD}$ is a tangent to the circle at C

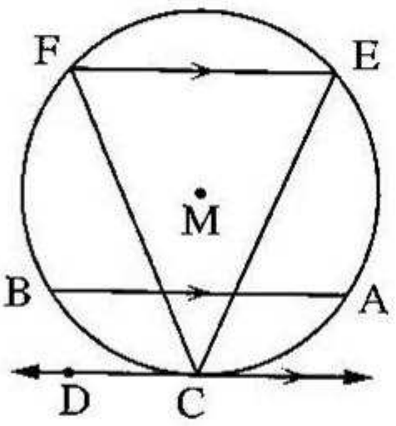
Where $\overline{AB}$ // $\overline{EF}$ // $\overleftrightarrow{CD}$

Prove that : CE = CF

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

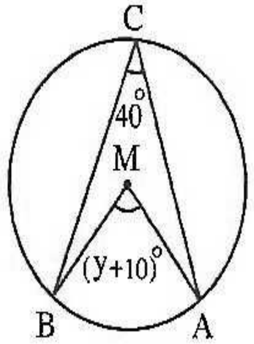


Unit 5 Lesson 2 : Relation between central angles & inscribed angles with same arcs

1)In the opposite figure :

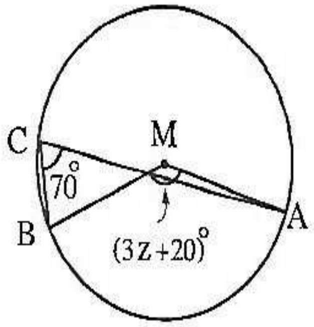
M is a circle. In each of the following, **find the value of the symbol used in measuring :**

1



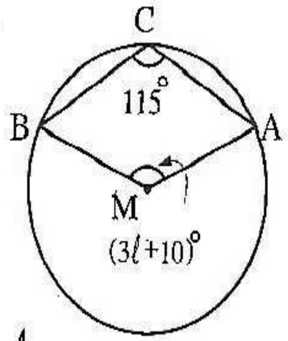
$y =$ ……….

2



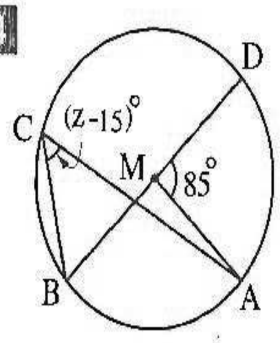
$z =$ ……….

3



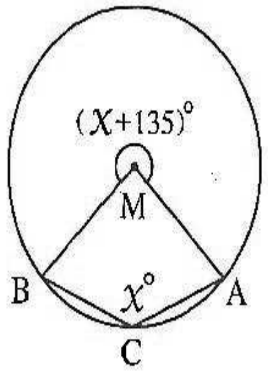
$\ell =$ ……….

4



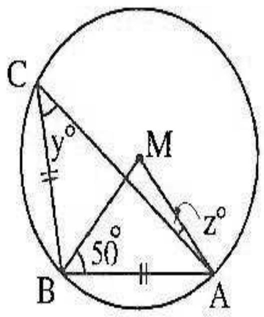
$z =$ ……….

5



$X =$ ……….

6



$y =$ ……….

$z =$ ……….

2)In the opposite figure :

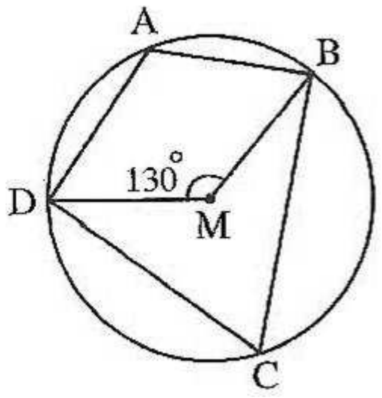
Find : m ($\angle BCD$) , m ($\angle BAD$)

………………………………………………………………..

………………………………………………………………..

………………………………………………………………

……………………………………………………………



3)In the opposite figure :

Find :the area of the circle M ($\pi = \frac{22}{7}$)

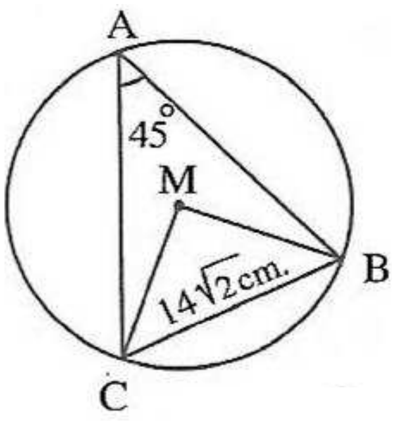
…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………



4)In the opposite figure :

Find: m ($\angle MBC$)

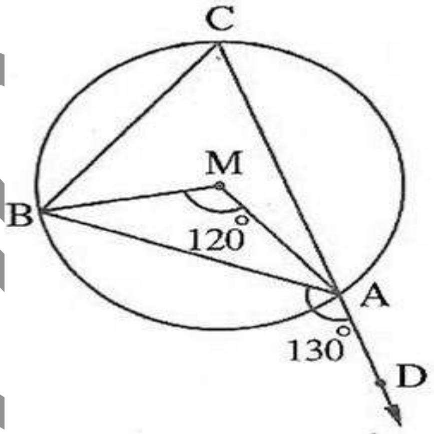
…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………



5)In the opposite figure :

Prove that : m ($\angle AMC$) = m ($\angle ADB$)

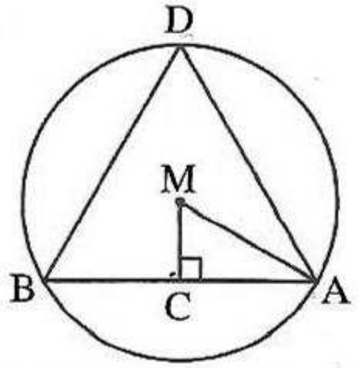
…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………



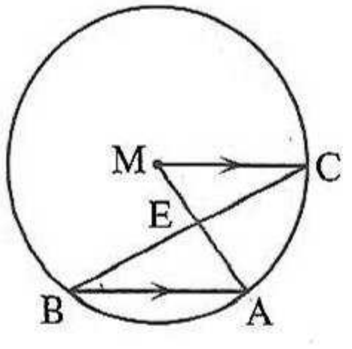
6)In the opposite figure :

Prove that : BE> AE

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………



Unit 5 Lesson 3 : Theorem 1 & corollaries

1)Complete :

1)The measure of the arc that is opposite the inscribed angle of measure 50° = …

2)The inscribed angle which is drawn in a semicircle is………

3)If two chords intersect at a point inside a circle , then the measure of the included angle equal ………… of the sum of the two measures of the two arcs .

4)The length of the arc that is opposite a right inscribed angle in a circle whose Circumference is 44 cm equals ……………… cm

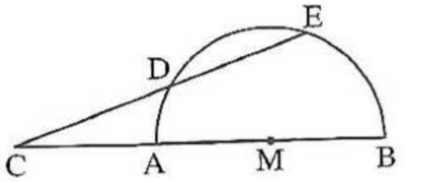
5)The measure of the inscribed angle which is drawn in $\frac{1}{3}$ a circle equals ………

2)In the opposite figure :

$\overline{AB}$ is a diameter in circle M

, m (∠ C) = 20° , m ($\overset{\frown}{BE}$) **= 70°**

Then m ($\overset{\frown}{DE}$) = ………….°



……

……

……………………………………………………………………………

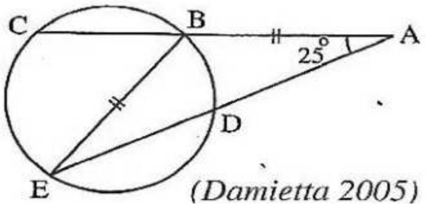
3)In the opposite figure :

m ($\overset{\frown}{CE}$) = ………….°

…………………………………………………………………………

…………………………………………………………………………

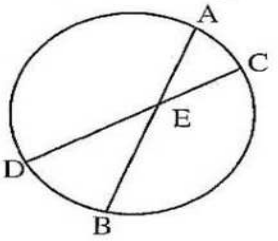
…………………………………………………………………………



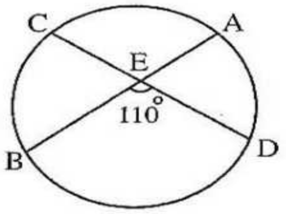
(Damietta 2005)

Geel 2000

4 **Complete the following :**



If m ($\widehat{AC}$) + m ($\widehat{BD}$) = 80° ,
then m (∠ AEC) = ...°



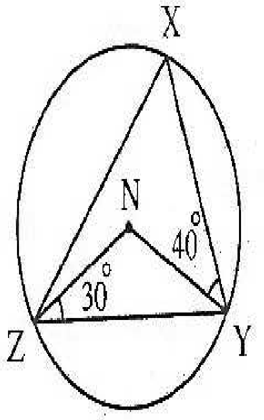
If m (∠ DEB) = 110° ,
m ($\widehat{BC}$) = 70° , then m ($\widehat{AD}$) = ...°

5 **In the opposite figure :**

XYZ is a triangle inscribed in the circle N ,

m (∠ XYN) = 40° , m (∠ NZY) = 30°

Complete :



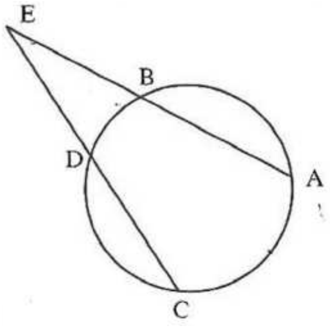
1 m (∠ N) = ...°

2 m (∠ X) = ...°

3 m ($\widehat{XZ}$) = ...°

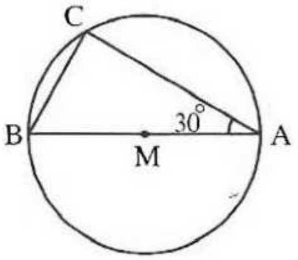
4 m ($\widehat{XY}$) = ...°

6)In the opposite figure :



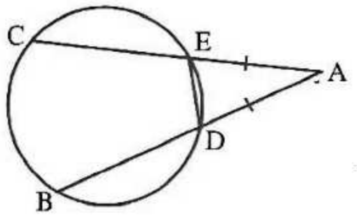
m ($\widehat{AC}$) - m ($\widehat{BD}$) = 70°
then m (∠ E) =............

7)In the opposite figure :



$\overline{AB}$ is a diameter in circle M
, r = 4 cm , m (∠ A) = 30 ° , BC = ……… cm

8)In the opposite figure :



If m ($\overset{\frown}{BC}$) = 112° , m ($\overset{\frown}{DE}$) = 44° , DA = AE
Then m (∠ ADE) = ……………

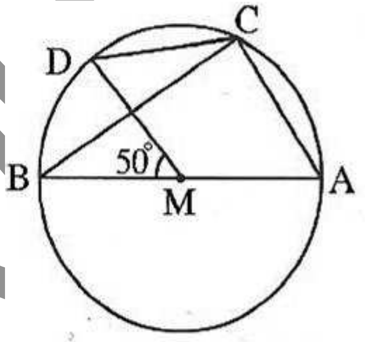
……………………………………………………………………...

……………………………………………………………………..

………………………………………………………………………

………………………………………………………………………

9)In the opposite figure :



$\overline{AB}$ is a diameter in the circle M
m($\angle BMD$) = 50° **Find with proof: m($\angle ACD$)**

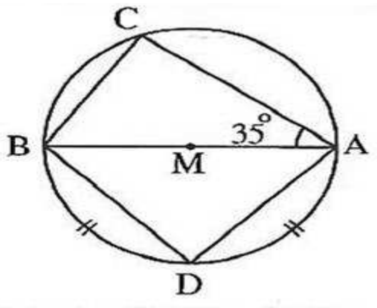
……………………………………………………………………...

……………………………………………………………………..

………………………………………………………………………

………………………………………………………………………

10)In the opposite figure :



Find with proof: m($\angle CBD$)

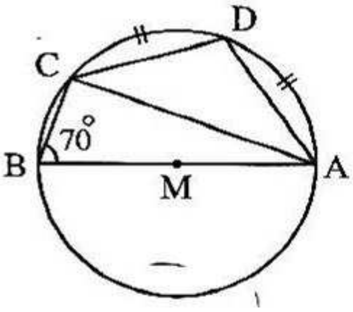
……………………………………………………………………...

……………………………………………………………………..

………………………………………………………………………

………………………………………………………………………

11)In the opposite figure :



Find with proof: m($\angle DCA$) , m($\angle CAB$)

……………………………………………………………………...

……………………………………………………………………..

………………………………………………………………………

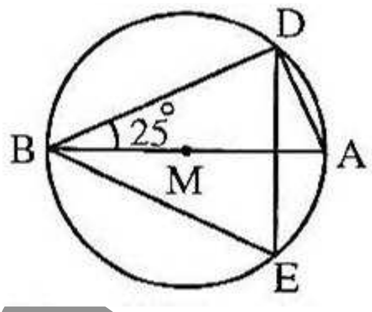
………………………………………………………………………

Geel 200

Unit 5 Lesson 4: Inscribed angles with

<u>1)In the opposite figure :</u>

Find : m (∠ DEB)



…………………………………………………………………….

…………………………………………………………………….

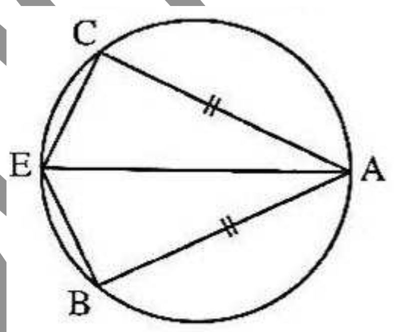
…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

<u>2)In the opposite figure :</u>

Prove that : m (∠ AEB) = m (∠ AEC)



…………………………………………………………………….

…………………………………………………………………….

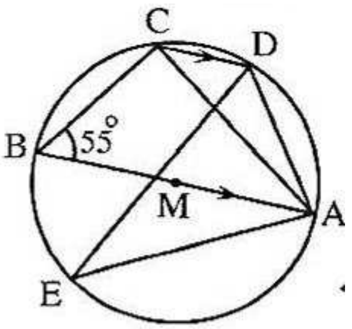
…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

<u>3)In the opposite figure :</u>

Find : m (∠ AED)



…………………………………………………………………….

…………………………………………………………………….

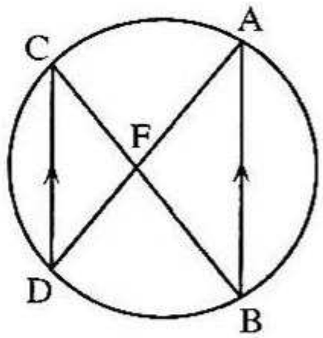
…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

<u>4)In the opposite figure:</u>

Prove that: AF = FB



…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

5)In the opposite figure:

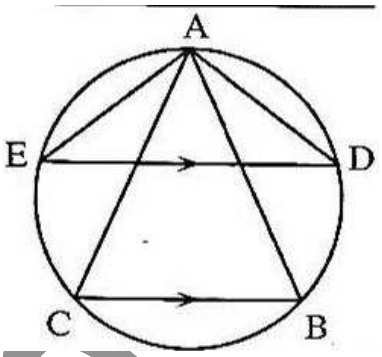
Prove that : m (∠ DAC) = m (∠ BAE)

……………………………………………………………………...

……………………………………………………………………..

....

....



6)In the opposite figure :

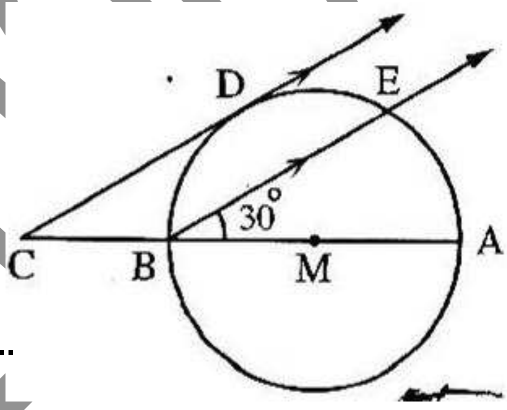
Find with proof : m ($\overset{\frown}{BD}$)

…………………………………………………………………..

……………………………………………………………………..

....

....



7)In the opposite figure :

Find :m($\angle ACB$)

……………………………………………………………………...

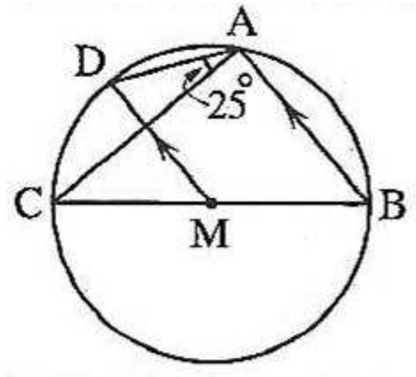
……………………………………………………………………..

....

....

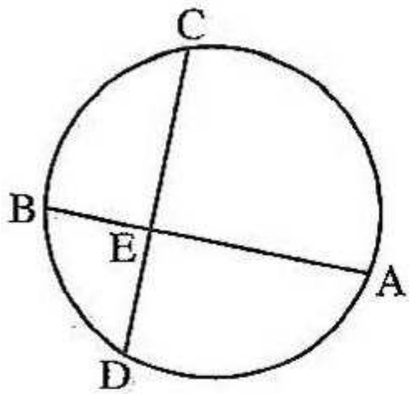
……………………………………………………………………...

……………………………………………………………………..



Geel 2020

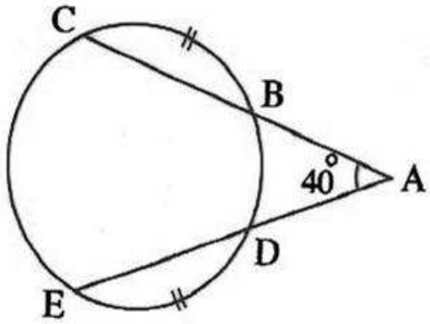
8)In the opposite figure :



m($\overset{\frown}{BD}$) = 60° , m ($\overset{\frown}{AD}$) = 100° , m ($\overset{\frown}{AC}$) = 120°
Find with proof : m ($\overset{\frown}{CB}$) , m ($\angle ACB$)

……………………………………………………………………....
……………………………………………………………………...
………………………………………………………………………………

9)In the opposite figure :

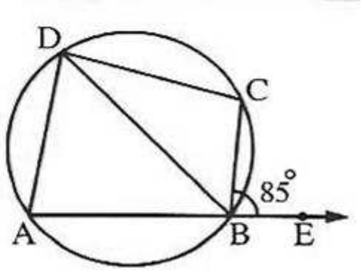


If m ($\angle$A)= 40° , m ($\overset{\frown}{BD}$) = 60°
Find with proof : m ($\overset{\frown}{CB}$) , m ($\overset{\frown}{EC}$)

……………………………………………………………………....
……………………………………………………………………...
………………………………………………………………………………
………………………………………………………………………………
.

Unit 5 Lesson 5: Cyclic quad & it's prop. & theorem 3 with its converse same arc

1)In the opposite figure:



m ($\overset{\frown}{AB}$) =110° and m(∠CBE) = 85°

Find : m (∠BDC)

…………………………………………………………………...

…………………………………………………………………...

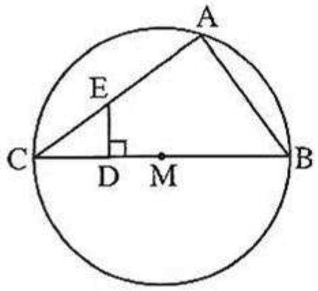
……………………………………………………………………………

……………………………………………………………………………

2)In the opposite figure:

Prove that: The figure ABDE is a cyclic quadrilateral

m(∠CED) = $\frac{1}{2}$ m($\overset{\frown}{AC}$)



…………………………………………………………………...

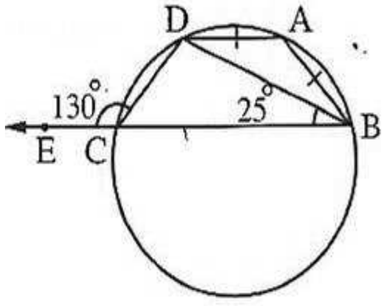
…………………………………………………………………...

……………………………………………………………………………

……………………………………………………………………………

3)In the opposite figure:

Prove that: AD = DC



…………………………………………………………………...

…………………………………………………………………...

……………………………………………………………………………

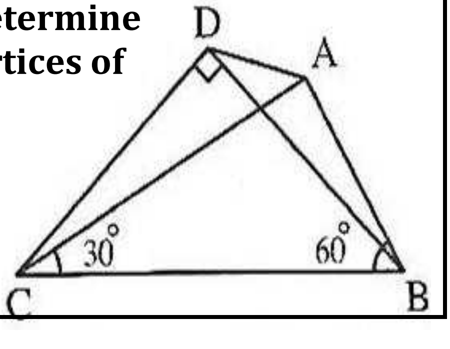
……………………………………………………………………………

4)In the opposite figure:

$m\ (\angle\ BDC\ )= 90°$, $m\ (\angle\ ABC\ ) = 60°$

$m\ (\angle\ ACB\ )= 30°$

Prove that: The figure ABCD is a cyclic quadrilateral determine where is the center of the circle passes through the vertices of figure ABCD

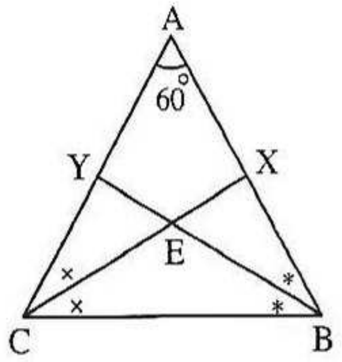


…………………………………………………………………...

Geel 2000

<u>5)In the opposite figure:</u>

Prove that : AXEY is a cyclic quadrilateral



……………………………………………………………….

……………………………………………………………….

....

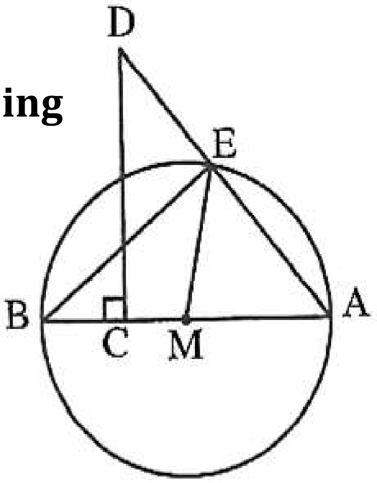
....

<u>6)In the opposite figure:</u>

Prove that :

1)The points D , E , C and B have one circle passing Through them .

2) m(∠AME) = 2 m (∠ D)



……………………………………………………………….

……………………………………………………………….

....

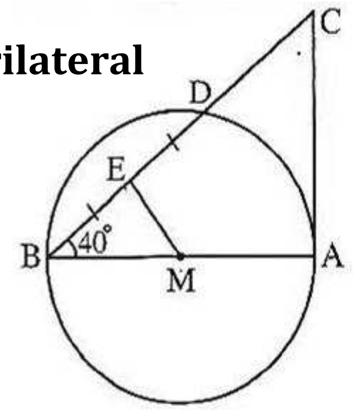
....

Geel2000

<u>7)In the opposite figure:</u>

Prove that : 1)The figure AMEC is a cyclic quadrilateral

2)m(∠ C)



……………………………………………………………….

……………………………………………………………….

....

....

....

8)In the opposite figure:

Prove that : 1)The figure AEFD is a cyclic quadrilateral

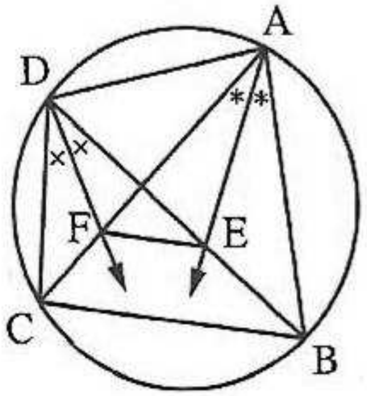
2)$\overline{EF} \;//\; \overline{BC}$

……………………………………………………………………...

……………………………………………………………………...

……………………………………………………………………...

……………………………………………………………………...



9)In the opposite figure:

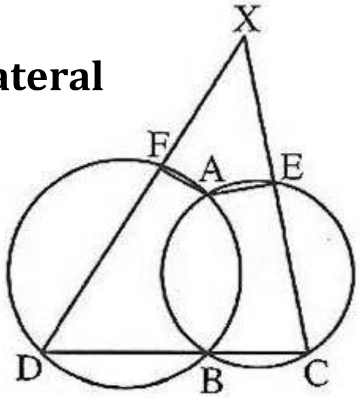
Prove that : The figure AFXE is a cyclic quadrilateral

……………………………………………………………………...

……………………………………………………………………...

……………………………………………………………………...

……………………………………………………………………...



10)In the opposite figure:

$m(\angle C) = 50°$, $m(\angle A) = 80°$

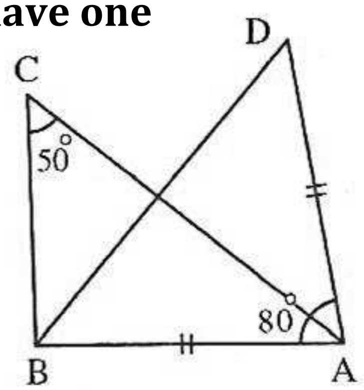
AD = AB ,**Prove that: The points A , B , C and D have one Circle passing through them .**

……………………………………………………………………...

……………………………………………………………………...

……………………………………………………………………...

……………………………………………………………………...



Unit 5 Lesson 6: Relation between tangents of circle

<u>1)In the opposite figure :</u>

Prove that : AB = CD

…………………………………………………………...

…………………………………………………………..

……………………………………………………………

……………………………………………………………….

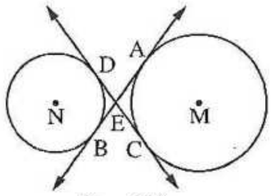


fig. (1)

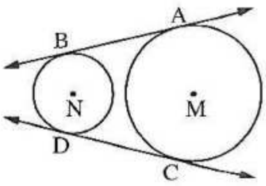


fig. (2)

<u>2)In the opposite figure :</u>

Prove that :

1) $\overrightarrow{AB}$ *bisects* $\angle DAX$

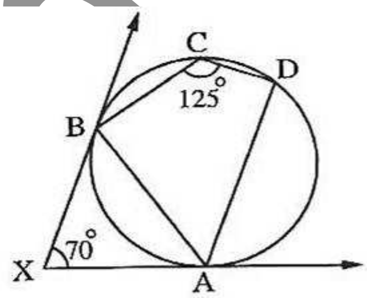
2)$\overline{AD}$ // $\overrightarrow{XB}$

……………………………………………………………….

…………………………………………………………………

……………………………………………………………….

……………………………………………………………….



<u>3)In the opposite figure :</u>

Prove that :

1) $\overrightarrow{CB}$ *bisects* $\angle ACD$

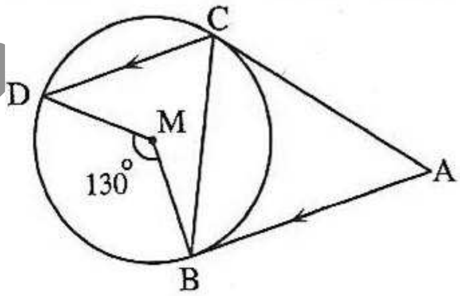
2)Find : m($\angle A$)

……………………………………………………………….

…………………………………………………………………

……………………………………………………………….

……………………………………………………………….



<u>4)In the opposite figure :</u>

Prove that :

1) C is the midpoint of $\overline{AB}$

2)$\overline{AD}$ ⊥ $\overline{BD}$

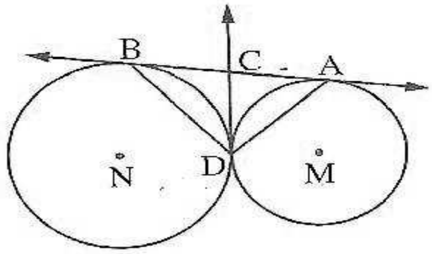
……………………………………………………………….

…………………………………………………………………

……………………………………………………………….

……………………………………………………………….

.



5)Complete :

1) The two tangents drawn to the circle at the two ends of a diameter in it are …………………

2)The two tangent segments drawn to a circle from a point outside it are ………………..

3)The number of common tangents of two distant circle is ………………..

4)In the opposite figure :

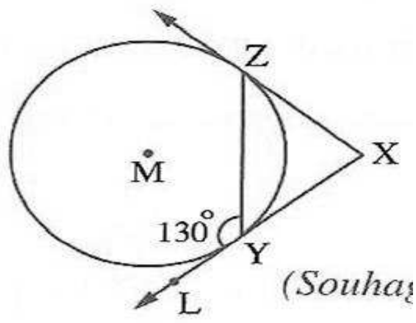
m (∠ X) = ………………………

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….



5)In the opposite figure :

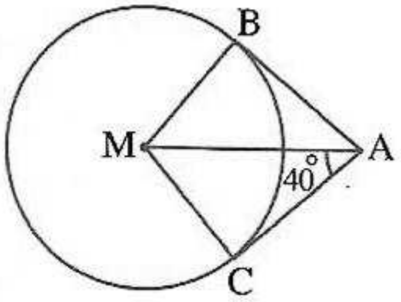
m (∠ CAB) = ………………………

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….



6)In the opposite figure :

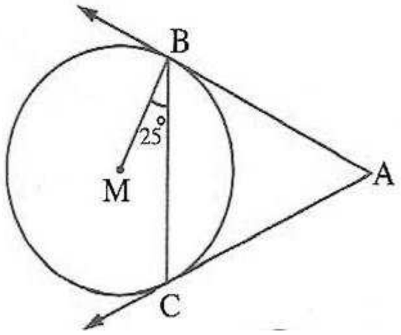
m (∠ CAB) = ………………………

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….

…………………………………………………………………….



Geel 20

7)In the opposite figure :

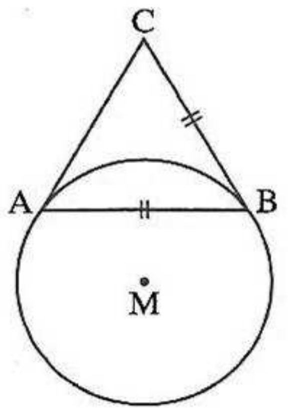
m (∠ C) = ……………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….



8)In the opposite figure :

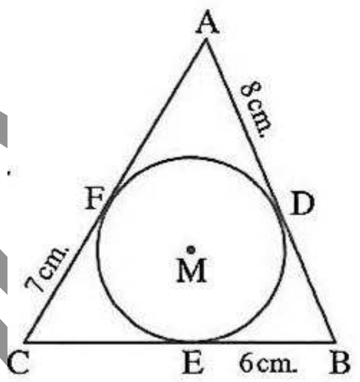
Perimeter of Δ ABC = ……………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….



9)In the opposite figure :

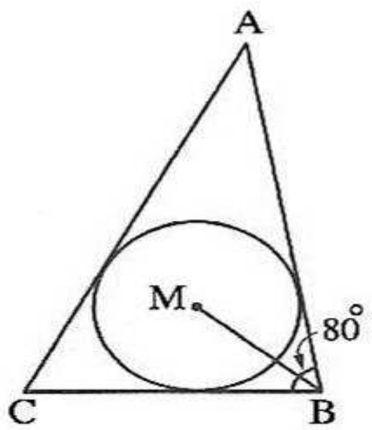
m (∠ CBM) = ……………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….



Unit 5 Lesson 7: Angles of tangency& converse of theorem 5

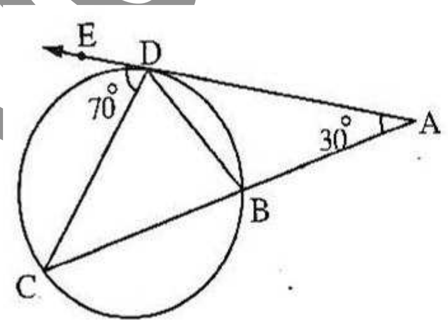
1)Complete:

1)The angle of tangency is the included angle between …………. , …………..

2)The measure of the angle of tangency equals the measure of ……………...subtended by the same arc .

3)The measure of the angle of tangency equals half the measure of ……………...subtended by the same arc .

4)In the opposite figure :

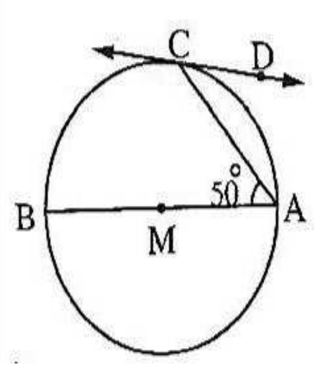


m(∠DBC) = ………

m(∠ADB) =………..

m(∠BCD) = ………..

5)In the opposite figure :

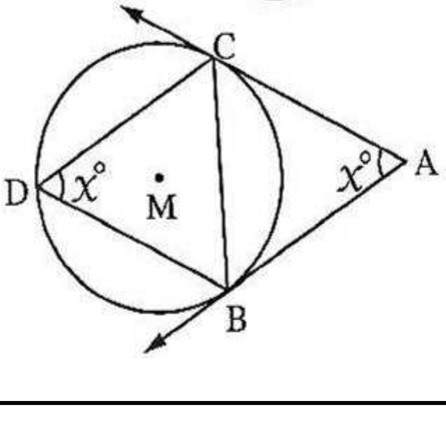


m($\overset{\frown}{BC}$)= …………….   ,m ($\overset{\frown}{AC}$) = ………..

m(∠ACD) = ………..

2)In the opposite figure :

Find the value of x



…………………………………………………………………...

…………………………………………………………………...

…………………………………………………………………...

…………………………………………………………………...

Geel 2000

3)In the opposite figure :

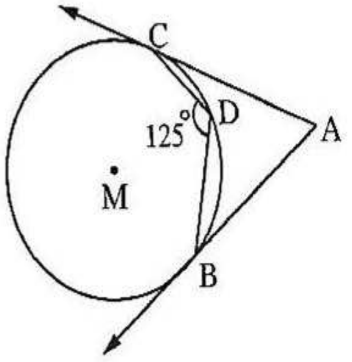
Find m(∠A)

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….



4)In the opposite figure :

Prove that :

1)The figure ABCD is a cyclic quad.

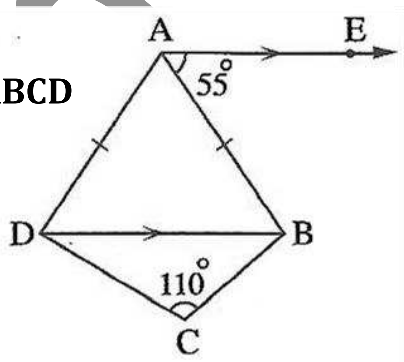
2)$\overrightarrow{AE}$is a tangent to the circumcircle of the quad. ABCD

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….



5)In the opposite figure :

Prove that :

1) $\overline{BE}$ //$\overline{AC}$

2)Find : m(∠CDE)

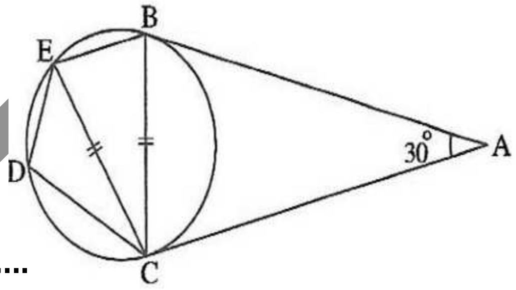
3)$\overline{CE}$is a tangent segment to the circle Passing through the points A , B , C

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….



6)In the opposite figure :

Prove that :

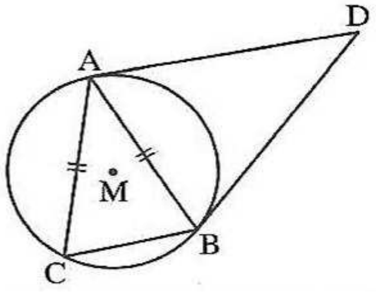
$\overleftrightarrow{AC}$ is a tangent to the circumcircle of Δ ABD

………………………………………………………………….

………………………………………………………………….

………………………………………………………………….

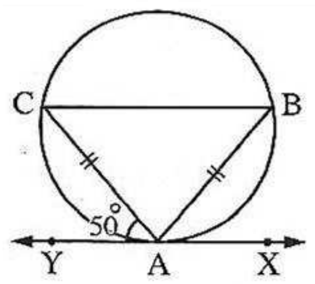
………………………………………………………………….



7)In the opposite figure :

Find m($\overset{\frown}{BC}$)

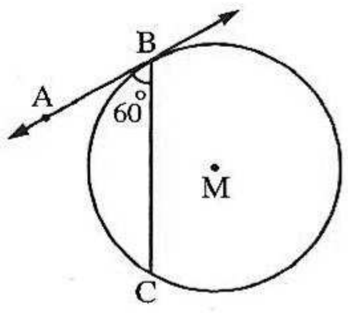
………………………………………………………………………...
……………………………………………………………………………..
....
....



8)In the opposite figure :

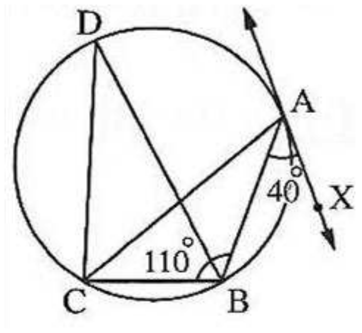
Find m($\overset{\frown}{BC}$)

………………………………………………………………………...
……………………………………………………………………………..
....
....



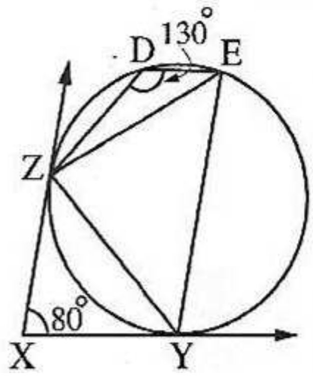
9)In the opposite figure:
Find : m(∠CDB)

………………………………………………………………………...
……………………………………………………………………………..
....
....



10)In the opposite figure :
Prove that:
1) ZE = ZY
2)$\overline{XZ}$ // $\overline{YE}$

………………………………………………………………………...
……………………………………………………………………………..
....
....



General Exercise on Unit five

First : Complete the following

(1) The two opposite angles in the cyclic quadrilateral are ………..

(2) The chords which opposite to equal arcs in any circle are ………..

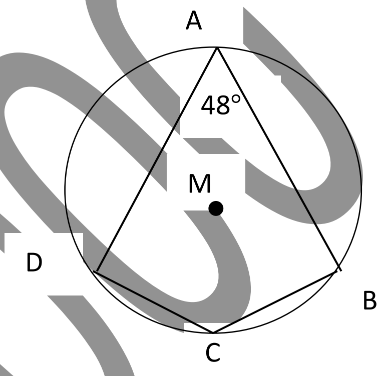
(3) The measure of the inscribed angle equals half the measure of ………

(4) In the opposite figure

In a circle M, m $(\angle A) = 48^{\circ}$, then:

[1] m $(\angle C)$ = …….

[2] m $(\widehat{BD})$ = ……… "$(\widehat{BD})$ is the major arc"



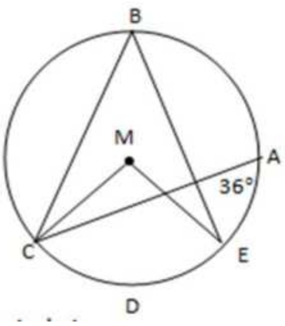
(5) The quadrilateral is said to be a cyclic quad.If the measure of an exterior angle at any vertex equals the ……… of the angle which opposite to its adjacent.

(6) In opposite figure

In a circle M, m $(\angle CAE)$ = 36° , then:

(a) m $(\angle EBC)$ =………. (b) m $(\angle EMC)$ = ……….

(c) m $(\angle EDC)$ = ………



(7) The inscribed angle which opposite to a major arc in a circle is ………

(8) The two parallel chords in a circle intercept two ……. arcs

(9) The measure of an arc of a circle equals double ……….

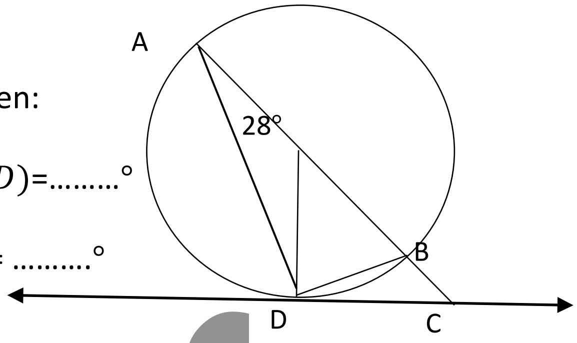
(10) The two inscribed angles subtended in the same arc in a circle are ……

(11) The altitudes of any triangle are ……..

(12) In the opposite figure

In a circle M, $\overline{AB}$ is a diameter,

$\overleftrightarrow{CD}$ is a tangent at D, m $(\angle BAD)$ = 28° , then:



[1] m $(\angle BDM)$ = ……… ° , [2] m $(\angle BMD)$=………°

[3] m $(\angle BDC)$= ………. ° , [4] m $(\widehat{AD})$ = ……….°

[5] m $(\angle C)$ = $\frac{1}{2}$ [m $(\widehat{\ldots..})$ - m $(\widehat{\ldots..})$]

(13) The two tangent drawn from the two end of a diameter in any circle are ……….

(14) The measure of the angle of tangency equals ….. the central angle on its common arc.

(15) The number of all common tangent drawn to two distant circles equals …….

(16) The centre of the inscribed circle of any triangle is the point of intersection of ……..

Second: Choose the correct answer from the given ones

(1) The two opposite angles in the cyclic quadrilateral are …….

(a) equal (b) complementary

(c) supplementary (d) alternate

(2) The center of the inscribed circle of any triangle is the point of intersection of its ………

(a) altitudes (b) medians

(c) bisectors of its angles (d) axes of symmetry of its sides

(3) The inscribed angle which opposite to the minor arc in a circle is ……

(a) reflex (b) right

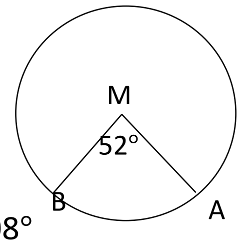
(c) obtuse (d) acute

Geel 2000

(4) In the opposite figure

In circle M,m ($\angle AMB$) = 52° , then

m ($\angle ABD$) = …….°



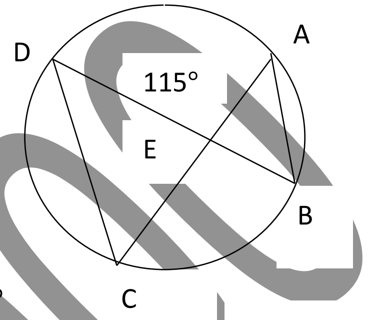
(a) 52° (b) 104° (c) 128° (d) 308°

(5) In the opposite figure

$\overline{AC}$, $\overline{BD}$ are two intersecting chords in a circle M,

If m($\angle A$)= 35° and m($\angle AED$)= 115° ,

then m($\widehat{AD}$)= ………. °

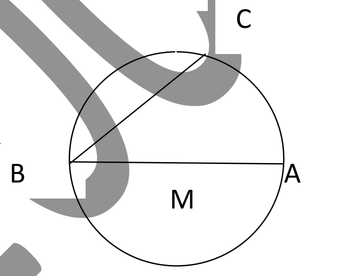


(a) 70° (b) 80° (c) 115° (d) 160°

(6) In the opposite figure

$\overline{AB}$is a diameter in a circle M,

m($\angle ABC$)= 40° , then m($\widehat{BC}$)= ……..°



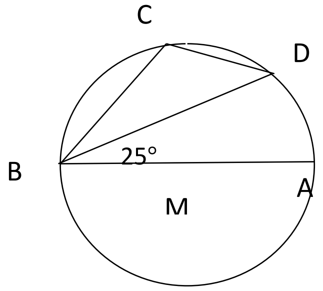
(a) 40° (b) 50° (c) 90° (d) 100°

(7) In the opposite figure

$\overline{AB}$ is a diameter in a circle M,

m($\angle ABD$)= 25° , then

[1] m($\angle DAB$) = ……….°



(a) 25° (b) 50° (c) 65° (d) 90°

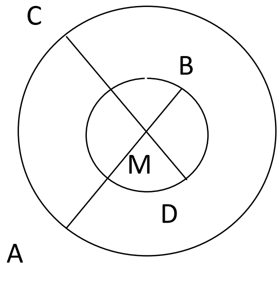
[2] m($\angle DCB$)=……..°

(a) 50° (b) 100° (c) 115° (d) 125°

(8) In the opposite figure

Two concentric circle at M, $\overline{AB}\cap\overline{CD}$ = {M},

If m($\widehat{BD}$) = 80° , then m($\widehat{AC}$)=………..

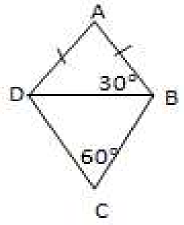


Third : Answer the following question

(1) (a) Prove that the two opposite angles in a cyclic quad

are supplementary.

(b) In the opposite figure

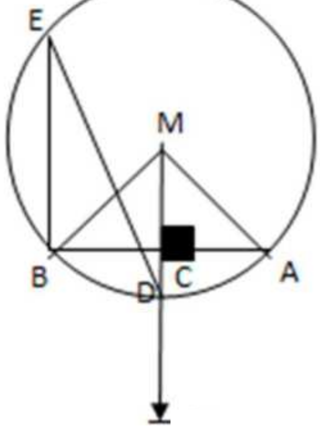


ABCD is a quadrilateral in which AB = AD ,

m($\angle ABD$)=30° and m($\angle C$)=60°Prove that ABCD is a cyclic quad

(2) ABCD is a cyclic quadrilateral in which $\overline{AB}$ // $\overline{CD}$, if E is the mid point of $\widehat{AB}$. Prove that EC = ED ?

3) In the opposite figure



$\overrightarrow{MC} \cap \overleftrightarrow{AB}$ = {c} , $\overline{MC}$ intersect the circle a D .

m($\angle MAB$)=20° , Find

[1] m($\widehat{AD}$)

[2] m($\angle DEB$)

(4) ABC is an acute angled triangle drawn inside a circle. Draw $\overrightarrow{AD} \perp \overline{BC}$ to cut $\overline{BC}$ at D and cuts the circle at E circle, then draw $\overrightarrow{CN} \perp \overline{AB}$ to cut $\overline{AB}$ at N. Prove that :

[1] ANDC is a cyclic quad

[2] m($\angle BND$)=m($\angle BED$)

Geel 2000

(5) ABC is an equilateral triangle drawn inside a circle, D is a point on the arc $\widehat{AB}$, E is a point on $\overline{DC}$ such that AD = DE. Prove that:

[1] ADE is an equilateral triangle

[2] $\overline{DB}$ // $\overline{AE}$

[3] m($\angle DCB$)= m($\angle EAC$)

[4] DE = EC

(6) In the opposite figure

ABC is a triangle in which AB = AC . $\overline{BC}$ is a chord

In the circle M, if $\overline{AB}$, $\overline{AC}$ cut the circle at D, E

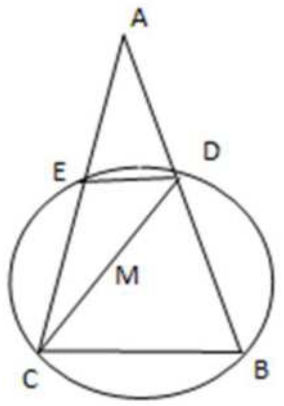
Prove that:

$\overline{BC}$ // $\overline{DE}$

and if m($\angle DCA$)= 30° and m($\angle A$) = 50°,

Find :

[1] m($\angle BEC$) [2] m($\angle BMC$) [3] m($\angle CDE$)



(7) (a) prove that the angles subtended by the same arcs in the circle are equal in measure.

(b) In the opposite figure

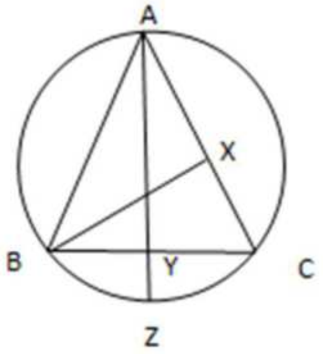
ABC is a triangle in a circle,$\overline{BX} \perp \overline{AC}$, $\overrightarrow{AY} \perp \overline{BC}$

Cuts it at Y and cuts the circle at Z,

Prove that:

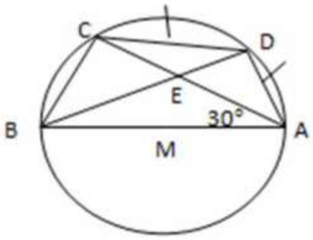
[1] ABXY is a cyclic quad

[2] $\overline{BC}$ bisects $\angle XBZ$



Geel 20

(8) In the opposite figure



$\overline{AB}$ is a diameter of a circle M, C ∈ the circle,

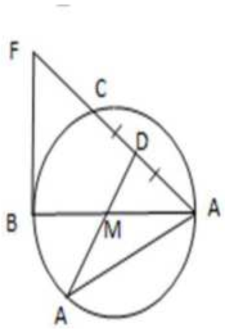
m($\angle CAB$) = 30° , D is the mid point of the arc $\widehat{AC}$

and $\overline{DB} \cap \overline{AC}$ = {E}.

[1] Find m($\angle BDC$) , m($\angle ABD$)

[2] Prove that Δ ABE is an isosceles triangle.

(9) In the opposite figure

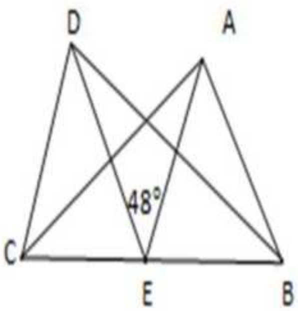


$\overline{AB}$ is a diameter of a circle M, D is the mid point of the arc $\widehat{AC}$ Draw $\overrightarrow{DM}$ to cut the circle at, $\overrightarrow{BF}$ is a tangent to the circle to cut $\overrightarrow{AC}$ at F.

Prove that:

[1] MBFD is a cyclic quad. [2] $\overline{DM}$ // $\overline{BC}$

(10) In the opposite figure



m($\angle BAC$) = m($\angle BDC$) = 90° .

E is the mid point of $\overline{BC}$ and m($\angle AED$) = 48° .

[1] Find m($\angle ABD$)

[2] Prove that:

(a) m($\angle ABD$) = m($\angle ACD$)

(b) m($\angle AEC$) = 2m($\angle ABC$)

Geel 2000

Models Exams in Geometry

Model (1)

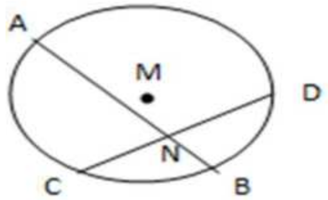
[1] Complete the following :

(1) The radius of the circle is the line segment joining between………………

(2) In the opposite figure

If $(\widehat{AC})$ = 100° , m $(\widehat{BD})$ = 60° ,

then m(∠BND) = ……..



(3) Any three points not belonging to a straight line

then …… Passes through them.

(4) In the same circle, the chord of the equal

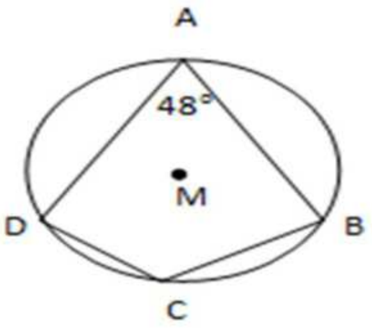
arcs in measure are………

(5) The measure of the inscribed angle

equals half the measure of …….

<u>(6) In the opposite figure</u>

If M is a circle, m (∠A) = 48° , then:



[1] m(∠C) = ……..

[2] m $(\widehat{BD})$ = ……… "major"

[**2] Choose the correct from the given ones:**

(1) Axis of symmetry of the common chord $\overline{AB}$ for two intersecting circle is M and N is ……..

(a) $\overleftrightarrow{MA}$ (b) $\overleftrightarrow{MB}$ (C) $\overleftrightarrow{MN}$ (d) $\overleftrightarrow{NA}$

(2) If M is a circle of diameter 7 cm , A is a point on its plane and MA = 4 cm . The position of with respect this circle is ……

(a) inside the circle (b) outside the circle

(c) on the circle (d) coincide on the centre

(3) If M a circle of diameter 8 cm, L is a straight line

at distance 3 cm. from its centre, then L …….

(a) touches the circle (b) secant to the circle

(c) lies outside the circle (d) axis of symmetry to the circle

(4) The two tangent which drawn from the two ends of a diameter of a circle are …….

(a) parallel (b) equal in length

(c) congruent (d) intersecting

Geel2000

(5) $\overrightarrow{AB}$ & $\overrightarrow{AC}$ are two tangents, m (∠A) = 60°,

If $\overline{AB}$ = 4cm, then $\overline{CB}$ = …… cm

(a) 3 (b) 4 (c) 5 (d) 8

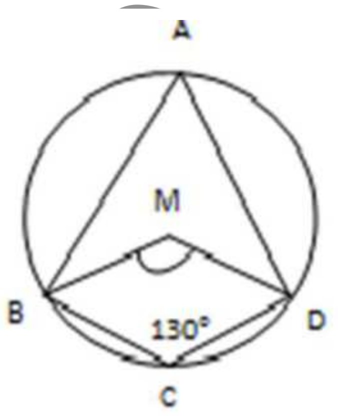
(6) In the opposite figure

M is a circle, m (∠BCD) = 130°

Then m (∠BMD) = ………°

(a) 50 (b) 230

(c) 100 (d) 260



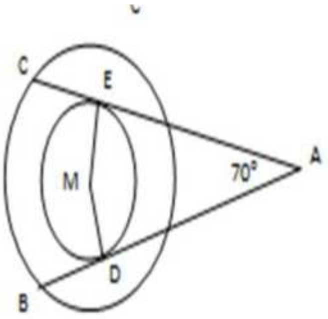
(3) (a) In the opposite figure

Two concentric circles at M, $\overline{AB}$, $\overline{AC}$ are two

Tangents to the smaller circle m (∠A) = 70°.

[1] Find m (∠DME).

[2] Prove that AB = AC.



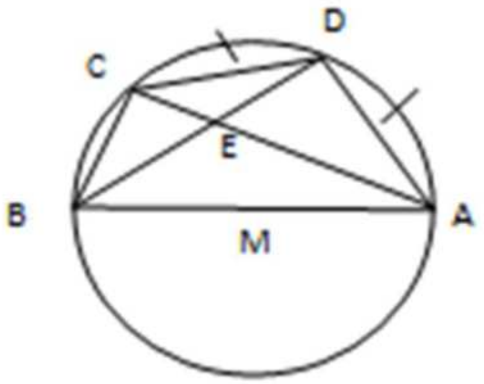
(b) ABC is a triangle in a circle M, m (∠AMB) = 90° ,

m (∠BMC) = 70°

Find the measure of all angles of the triangle ABC.

Geel2

(4) In the opposite figure



$\overline{AB}$ is a diameter of a circle M,

C ∈ the circle, m (∠CAB) = 30° ,

D is midpoint of

$\widehat{AC}$, $\overline{DB} \cap \overline{AC}$ = {E}.

[1] Find m (∠BDC), m (∠ABD)

[2] Prove that: Δ ABE is an isosceles triangle.

(5) (a) State three cases of cyclic quadrilateral

(b) $\overline{AB}$, $\overline{CD}$ are two orthogonal chords in a circle M, intersecting at E, draw $\overrightarrow{BF} \perp \overrightarrow{AC}$ cuts it at F $\notin \overline{AC}$. Prove that:

[1] FCEB is cyclic quadrilateral

[2] m (∠BFE) = m (∠BAD)

Geel 2000

Model (2)

{1} Complete the following :

(1) The diameter passing through the mid point of any chord is …………

(2) The number of symmetric axes of a circle equals ……….

(3) The line of centers of two touching circle is perpendicular to ………

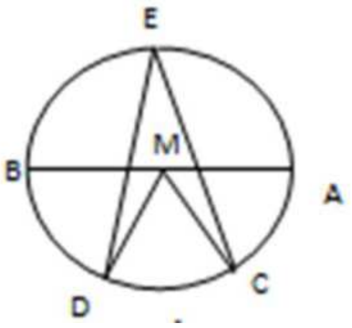
(4) The figure is said to be cyclic quad if the measure of any exterior angle at any vertex equals……. The opposite to its adjacent.

<u>(5) In the opposite figure :</u>

$\overline{AB}$ is a diameter in a circle M,

If m ($\widehat{AC}$) = m ($\widehat{CD}$) = m ($\widehat{DB}$), then

m (∠CMD) = ……….° , m (∠CED) = ……… °.



[2] choose the correct from the given ones:

(1) if $\overline{AB}$ is a line segment, then the number of circles can be dawn passing through A, B equal …….

(a) 1 (b) 2 (C) 3 (d) infinite number

(2) If the straight line L ∩ the circle M = ∅, the straight line L is ……..

(a) outside the circle (b) secant to the circle

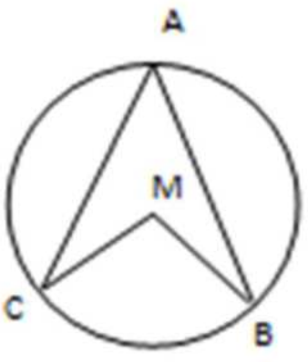
(c) tangent to the circle (d) axis of symmetry of the circle

<u>(3) In the opposite figure</u>

If M is a circle, m (∠M) – m (∠A) = 50° ,

Then m (∠A) = ………..

(a) 40° (b) 50° (c) 100° (d) 130°

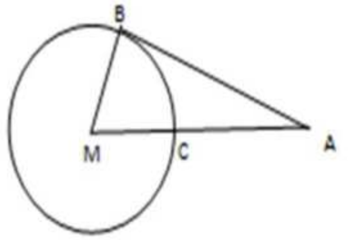


(4) In the opposite figure

$\overrightarrow{AB}$ is a tangent to circle M,

If MB = 5 cm , AC = 8 cm , then AB =………..cm

(a) 5cm (b) 10cm (c)12cm (d) 13cm



(5) All the centres of the circle which passes through the two point A, B lie on…….,

(a) the axis of $\overline{AB}$ (b) $\overline{AB}$

(c) the perpendicular to $\overline{AB}$ (c) the mid point of $\overline{AB}$

(6) If the length of an arc of a circle is $\frac{1}{3}\pi$ r, then its opposite central angle of measure ………

(a) 30° (b) 60° (c) 120 ° (d) 240°

(3) (a) Draw the circle which passes through the vertices of Δ ABC such that AB = 3 cm , BC =4cm and AC = 5cm .

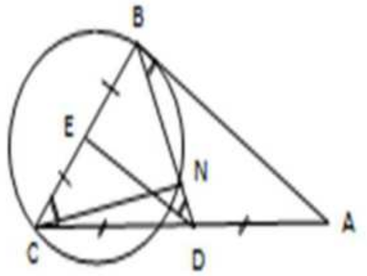
(b) In the opposite figure

$\overline{AB}$ is a tangent to circle M,

$\overline{AC}$ is a secant, where E is the mid point of $\overline{CB}$,

D is the mid point of $\overline{AC}$,

$\overline{BD}\cap$ the circle M = {N}



Prove that

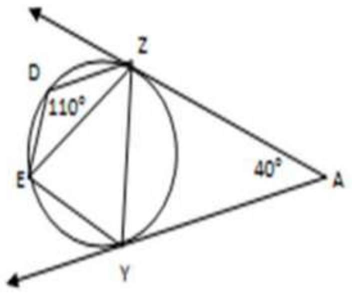
[1] $\overline{AB}$ // $\overline{DE}$

[2] The points N, D, C and E lie on one circle.

Geel 2000

(4) (a) $\overline{AB}$, $\overline{Ac}$ are two chords in a circle M. m (∠BAC) = 120° . X, Y are the mid points of $\overline{AB}$, $\overline{AC}$ respectively. Draw $\overrightarrow{XM}$ to cut the circle at D and $\overrightarrow{YM}$ to cut the circle at E. Prove that DE = r. (such r is the radius of the circle)

(b) In the opposite figure



$\overrightarrow{XY}$, $\overrightarrow{XZ}$ are two tangent to the circle from the

Point X, m (∠D) = 110°

Prove that:

m ($\widehat{ZE}$) = m ($\widehat{ZY}$)

(5) (a) $\overline{AB}$ is a diameter of a circle M, $\overline{AC}$ is a chord, E is the mid point of $\overline{AC}$, the tangent $\overleftrightarrow{BD}$ is drawn to cut $\overrightarrow{AC}$ at D , then draw $\overrightarrow{EM}$ to cut the circle at X. Prove that:

[1] MEDB is cyclic quadrilateral [2] 2 m (∠BAX) = m (∠D)

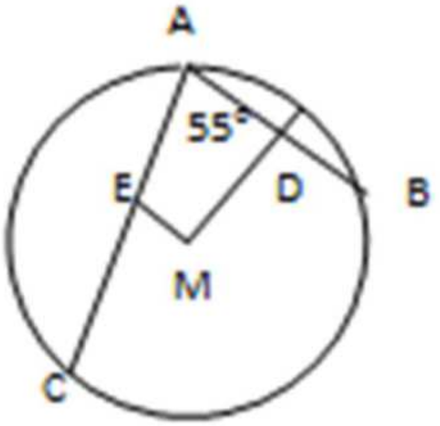
(b) In the opposite figure

$\overline{AB}$, $\overline{AC}$ are two chords in a circle M

D , E are the two mid points of $\overline{AB}$, $\overline{AC}$

respectively and m $(\angle \text{BAC}) = 55°$

Find m (∠DME)



Geel20

Model (3)

[1] Complete the following

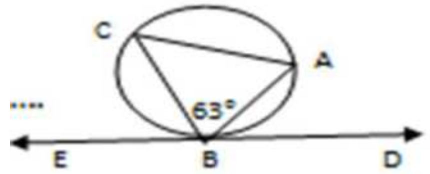
(1) The line of centres of two touching internally circles passing …………

(2) A circle of radius, A is point on its plan, if MA = $\frac{3}{4}$ R, then A lies ………

(3) if surface of the circle $M_1 \cap$ the surface of the circle $M_2 = \emptyset$, then the two circle are ……..

(4) In the opposite figure

M (∠ABC) = 63°, $m(\angle CED) = 67°$



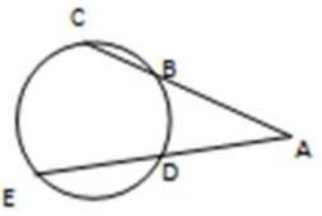
, then $m(\angle C) =$ ……….

(5) The two opposite angles of be cyclic quad are ………..

(6) In the opposite figure

m ($\widehat{CE}$) = 100° , m ($\angle\widehat{BD}$) = 30°

then m (∠A) = …………



[2] Choose the correct from the given ones:

(1) The ratio between the measure of the inscribed angle and the measure of the central angle subtended by the same arc equals ……..

(a) 1 : 2 (b) 2 : 1 (c) 1 : 1 (d) 1 : 3

(2) The measure of the arc which represents $\frac{1}{3}$ the measure of the circle equals……….

(a) 60° (b) 90° (c) 120° (d) 240°

(3) If R_1 , R_2 are the radii of the two circles M,N and MN$>$ R_1 +R_2 , them the two circles are ………

(a) touching internally (b) touching externally

(c) intersecting (d) distant

(4) If the two circles M, N are touching externally , the length of one radius of them is 3cm, MN = 7cm , then the length of the radius of the circle is …….

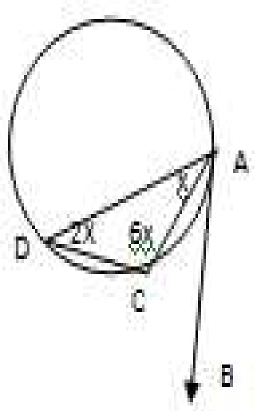
(a) 3cm (b) 4cm (c) 7cm (d) 10cm

(5) A chord of length 8cm in a circle of diameter 10cm , then chord at …….. from the cente of the circle ……..

(a) 3cm (b) 4cm

(c) 7cm (d) 10cm

(6) In the opposite figure:

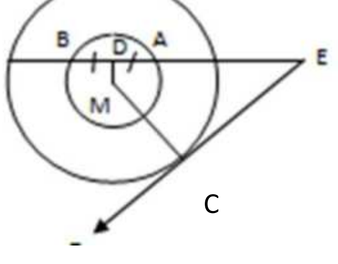


m (∠BAC) = ………….

(a) 20° (b) 40°

(c) 60° (d) 80°

<u>(3) (a) In the opposite figure:</u>



Two concentric circles of center M,

$\overrightarrow{EC}$ is a tangent to the greatest circle,

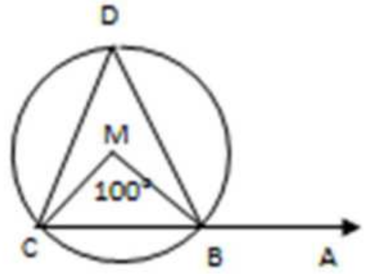
$\overline{EB}$ cuts the smallest circle at A, B.

D is the mid point of $\overline{AB}$ and m (∠CED) = 40°.

Find with proof m (∠DMC).

Geel 2000

(b) In the opposite figure

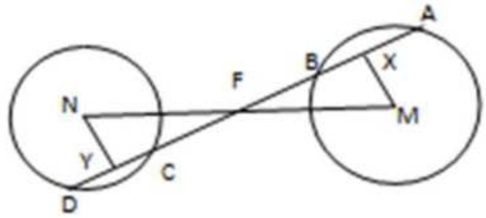


In the circle M, m (∠BMC) = 100°,

m (∠ABD) = 120° .

Find with proof m (∠DCB).

<u>(4) (a) In the opposite figure</u>



M and N are two distant and congruent Circles. Draw $\overleftrightarrow{AD}$ intersecting circle M at A and B intersects circle N at C and D respectively, if $\overline{MX} \perp \overline{AB}$, $\overline{NY} \perp \overline{CD}$, F is the midpoint of $\overline{MN}$.

Prove that: AB = CD.

Geel 2000

solution set of the equation $x^2 - 4x + 3 = 0$ and write the equation of the axis of symmetry

(b)If A ,B are two events in a random experiment, P(A) =0.7 , P(B) = 0.6 and P(A ∩ B) = 0.4 , find the probability of :

(1) Non occurrence of the event A.

(2) occurrence of one event without the other.

Geel 2000